UNITED STATES COURT OF APPEALS
FOR THE FIFTH CIRCUIT

No. 99-40502

LINDA KERSTETTER, INDIVIDUALLY,
AND AS PERSONAL REPRESENTATIVE
AND HEIR OF THE ESTATE OF DAVID JOSEPH HUBER,
Plaintiff-Appellant,

VERSUS

PACIFIC SCIENTIFIC COMPANY; ET AL.,
Defendants,

PACIFIC SCIENTIFIC COMPANY;
BEECH AEROSPACE SERVICES;
RAYTHEON AEROSPACE COMPANY;
BEECH AIRCRAFT CORP.;
RAYTHEON AIRCRAFT COMPANY,
Defendants-Appellees.

Appeals from the United States District Court
for the Southern District of Texas

April 18, 2000

Before HIGGINBOTHAM and PARKER, Circuit Judges; and WARD, District Judge.[1]

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[1] District Judge of the Eastern District of Texas, sitting by designation.

ROBERT M. PARKER, Circuit Judge:

Plaintiff-Appellant brought suit on behalf of her son, a deceased naval pilot, contending that the pilot restraint system in the T-34C aircraft he was flying at the time of his death was defectively designed. The defendants moved for summary judgment based on, *inter alia*, the government contractor defense. Because we find that the government contractor defense applies and that no genuine issues of material fact exist which would preclude summary judgment, we AFFIRM.

PROCEEDINGS BELOW AND FACTUAL HISTORY

This case arises from the 1995 death of Navy instructor pilot Lt. David Joseph Huber, who died while conducting a familiarization flight with a student pilot off Padre Island, Texas. Lt. Huber was inadvertently ejected from a T-34C aircraft during a training maneuver when his pilot restraint system ("PRS") released without command.[2] Pacific Scientific Company ("Pacific Scientific")[3]

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[2] The T-34C does not have an ejection seat. Lt. Huber was ejected when the negative G-forces created during a spin recovery maneuver propelled him through the canopy and out of the aircraft. Although Lt. Huber survived the ejection and his parachute initially functioned properly, he came out of his parachute prematurely and died from blunt force trauma upon impact with the water.

[3] Defendant Beech Aircraft Corporation ("Beech"), now known as Raytheon Aircraft Company, manufactured the aircraft in question. Defendant Beech Aerospace Services, Inc. ("BASI"), now known as Raytheon Aerospace Company, serviced the aircraft in question under contract with the Navy. For purposes of simplicity, this opinion will refer to the

manufactured the PRS on board the aircraft. The Navy conducted an investigation of the incident and concluded that a possible cause for the ejection was contact between the aircraft control stick grip and the rotary buckle that releases the restraint belts.

In late 1973, the Navy began Phase I testing of the T-34C[4] and specifically observed several deficiencies in the pilot restraint system (PRS). The Navy concluded that these deficiencies should be corrected. In mid-1974, Phase II testing focused on the PRS and concluded in a final report that the PRS was uncomfortable and functioned poorly during negative G testing. The report recommended corrective action.

By 1975, Beech had not yet corrected the PRS difficulties identified in Phase II testing; however, Beech proposed a fifth "crotch strap" with a quick release buckle in preparation for further testing. A preliminary evaluation in September of 1976 gave this new PRS a positive evaluation. The Navy performed further tests and found that "The pilot restraint system in the T-34C airplane is an enhancing characteristic which significantly improves airplane controllability during spins and should be included in future designs." In 1982, the Navy ordered 120 T-34Cs with this "crotch strap" design. All drawings were approved by the Navy through thorough review and

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manufacturer of the T-34C as "Beech," to the manufacturer of the pilot restraint system as "Pacific Scientific," and to the maintenance contractor for the T-34C simply as "BASI."

[4] The T-34C was a modification of the previous Navy flight trainer, the T-34B. The Navy used the T-34B as its basic trainer aircraft until the early 1970s.

training sessions. Once approved, these drawings could not be modified without Navy approval. The PRS design resulting from this review and testing process was the same as that in the victim's plane.

In a 1985 Field Engineering Action Team (FEAT) meeting, Beech heard reports for the first time of a phenomenon called "uncommanded seat harness release." The next year's meeting included an agenda item regarding "uncommanded seat harness release." This item was left open following the meeting. This is the last time Beech heard about the problem until after the accident that resulted in the filing of this action.

The Navy instructed students training in the T-34C to position their harness buckles under their life preservers to prevent inadvertent release of the PRS and also created a form for pilots to report occurrences of inadvertent releases.[5] The Navy took no further actions in response to this problem before the accident in this case. After this accident, a Navy official noted that the PRS posed a "severe flight hazard."

Kerstetter brought this suit on behalf of Lt. Huber against the named defendants. All defendants filed motions for summary judgment based on the government

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[5] The district court found that "if the harness is adjusted properly, the buckle is located underneath the pilot's life preserver unit so that it cannot come into contact with the aircraft's control stick. When the buckle is in front of the life preserver unit, it is possible when the control stick is in full-aft position (as occurs during spin entry) for the control stick to contact and inadvertently release the harness."

contractor defense and on the absence of summary judgment evidence to create a genuine issue of material fact. The district court granted defendants' motions.

STANDARD OF REVIEW

"We review a grant of summary judgment *de novo.*" *Kipps v. Caillier*, 197 F.3d 765, 768 (5th Cir. 1999). A district court's award of summary judgment is reviewed "using the same standard as that employed initially by the district court under Rule 56." *Stout v. Borg-Warner Corp.*, 933 F.2d 331, 334 (5th Cir. 1991). Pursuant to Rule 56, summary judgment is appropriate only where "there is no genuine issue as to any material fact and the moving party is entitled to judgment as a matter of law." Fed. R. Civ. P. 56. A factual dispute is "genuine" where a reasonable jury could return a verdict for the nonmoving party. *See Crowe v. Henry*, 115 F.3d 294, 296 (5th Cir. 1997). "If the record, taken as a whole, could not lead a rational trier of fact to find for the nonmoving party, then there is no genuine issue for trial." *Kipps*, 197 F.3d at 768.

DISCUSSION

I. The Government Contractor Defense

Government contractor immunity is derived from the government's immunity from suit where the performance of a discretionary function is at issue. *See Boyle v. United Tech. Corp.*, 487 U.S. 500, 511 (1988). The Supreme Court has noted that "the selection of the appropriate design for military equipment to be used by our Armed Forces is assuredly a discretionary function." *Id.*

In order for a contractor to claim the government contractor defense, (1) the government must have approved "reasonably precise" specifications; (2) the equipment must have conformed to those specifications; and (3) the supplier/contractor must have warned of those equipment dangers that were known to the supplier/contractor, but not to the government. *See Boyle*, 487 U.S. at 512; *Stout*, 933 F.2d at 336.

The government need not prepare the specifications to be considered to have approved them. *See Trevino v. General Dynamics*, 865 F.2d 1474, 1480 (5th Cir. 1989) (holding that "substantive review" is adequate). To determine whether "substantive review" occurred, a court must take into consideration a number of factors. The factors involve examining drawings, evaluation from time to time, criticism and extensive government testing – a "continuous back and forth" between the contractor and the government. *See In re Air Disaster at Ramstein Air Base, Germany*, 81 F.3d 570, 574 (5th Cir. 1996). The specifications need not address the specific defect alleged; the government need only evaluate the design feature in question. *See Boyle*, 487 U.S. at 512; *Trevino*, 865 F.2d at 1486 ("The government contractor defense as reformulated in *Boyle* protects government contractors from liability for defective designs if discretion over the feature in question was exercised by the government.").

Nonconformance with a specification means more than that the ultimate design feature does not achieve its intended goal. The alleged defect must exist independently of the design itself, and must result from a deviation from the required military specifications. *Cf. Bailey v. McDonnell Douglas Corp.*, 989 F.2d 794, 800 n.13 (5th Cir.

1993) ("For the reasons explained infra, we interpret Boyle's statement that the defense bars '[l]iability for design defects,' to mean liability for defects in the government specifications.") (citation omitted). Extensive government involvement in the design, review, development and testing of a product, as well as extensive acceptance and use of the product following production, is evidence that the product line generally conformed with the government-approved specifications. *See In re Air Disaster*, 81 F.3d at 575.

The third part of the *Boyle* test requires the contractor to warn the government about those equipment dangers that were known to the contractor, but not to the government. The purpose of this element is *not* to create an incentive to discover latent defects in a product designed for the government. *See Boyle*, 487 U.S. at 512 ("The third condition is necessary because, in its absence, the displacement of state tort law would create some incentive for the manufacturer to withhold knowledge of risks, since conveying that knowledge might disrupt the contract but withholding it would produce no liability."). The government contractor defense does not require a contractor to warn the government of defects about which it only should have known. "After *Boyle*, a government contractor is only responsible for warning the government of dangers about which it has actual knowledge." *Trevino*, 865 F.2d at 1487.

II. Plaintiff's Articulation of the *Boyle* Test is in Error

Plaintiff argues that, in the approval process, the government must have considered and rejected a safer

design alternative proposed by the plaintiff, or at least must have itself prospectively limited the discretion of the contractor to include a safer alternative design. The district court noted that this argument is well suited for presentation to Congress or to the Supreme Court rather than the district court but that it *is contrary to the case law. See Boyle*, 487 U.S. at 513; *Stout*, 933 F.2d at 334-35; *see also Tate v. Boeing Helicopters*, 140 F.3d 654 (6th Cir. 1998) (*Tate II*). The *Boyle* court noted that, while this is perhaps a reasonable rule of tort law, it did not sufficiently protect the federal interest in the selection of appropriate military equipment.

> The design ultimately selected may well reflect a significant policy judgment by Government officials whether or not the contractor rather than those officials developed the design. In addition, it does not seem to us sound policy to penalize, and thus deter, active contractor participation in the design process, placing the contractor at risk unless it identifies all design defects.

Boyle, 487 U.S. at 513. The district court noted that this last sentence can mean only that the defense applies even when the contractor did not warn the government of latent defects – in other words, defects that neither the contractor nor the government considered it at all. We agree. The articulation of the government contractor defense offered by the plaintiff is contrary to the case law.

III. Manufacturing Defect and Negligent Inspection

The district court held that the plaintiff presented no evidence of a manufacturing defect and granted defendants summary judgment on that claim. The claim for

negligent inspection presumes that a manufacturing defect existed, thus defendants were granted summary judgment on that claim as well.[6]

Plaintiff argues that summary judgment is inappropriate because fact issues exist with regard to this count. At the heart of the plaintiff's argument is a general specification paragraph found in the approved specifications for the T-34C issued by the Navy:

> Where any vital moving part passes close to a fixed structure or item of equipment, the point nearest contact shall be located or arranged that gravity will normally clear this point of loose articles or cause them to take remote positions where they cannot jam or interfere with the moving part.

Plaintiff claims that the design of the control stick (and its ability to inadvertently unbuckle the "crotch strap" at the full-aft position) violate this specification and thus constitute a manufacturing defect. Defendants argue that the cockpit design conformed to the specifications for the cockpit.

We agree with the district court that this specification cited by plaintiffs had to do with production techniques and not with cockpit design.

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[6] The district court noted that to the extent the negligent inspection claim was based on a design defect, that claim is displaced by the applicability of the government contractor defense to the design defect claim.

IV. Design Defect (Negligence, Strict Liability and Warranty)

Defendants claim that the government contractor defense immunizes them from liability in this case. The primary issue with regard to an alleged design defect in this case is whether the government approved reasonably precise specifications. The district court held that the unrebutted summary judgment evidence establishes that the government approved reasonably precise specifications for the design features in this case.

First, the T-34C originated as a modification of the T-34B, a plane the Navy had been using to train pilots for 20 years. The T-34B had the same PRS, the same control stick and the same cockpit design as the T-34C. Second, the government was extensively involved in the approval process. The record reveals a clear pattern of government-contractor interaction over at least eight years. Third, approval of the T-34C's design included the specific features at issue in this case. The defendants argue that "[t]he *defective nature* of the features may have been latent to the Navy as well as the contractors, but the features themselves were obvious to anyone who flew the T-34C." Fourth, the Navy specifically addressed the design features at issue in this case throughout the approval process.

The district court held that plaintiff's arguments that the government contract defense is not available are unavailing. First, plaintiffs argue that the defendants purchased the PRS "off the shelf." As noted by the district court, the government procurement officer did not order a quantity of restraint systems in the same way he would

order light bulbs, but rather, government engineers approved the inclusion of these specific components into a complex piece of equipment. In addition, the Navy specifically tested the T-34C's PRS during its evaluation of the aircraft following Phase II testing. Furthermore, neither counsel for the plaintiff nor counsel for the defendant were able to name or otherwise identify another aircraft which uses the PRS involved in this case.

Second, plaintiffs argue that the T-34C's PRS specifications conflict with another, more general specification. The district court held that the specifications cited by the plaintiff were not implicated by the facts of this case. The plaintiffs again refer to the "gravity clearance" paragraph in the specifications mentioned above. The argument was dismissed in the context of a manufacturing defect and is also unavailing in the design defect context.[7]

Lastly, the plaintiffs argue that the defense should not apply because the government did not actively limit the contractor's ability to develop a safer design. Basically, plaintiffs argue that a safer design could have been developed "without violating any specification." This argument focuses on an incorrect standard which is whether the government approved a specification that did not contain a safer design. The inapplicability of this standard to the case at bar has been addressed.

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[7] *Cf. In re Air Disaster*, 81 F.3d at 575 (noting that "such a general design specification is not contemplated by the first element of the Boyle test because 'only the detailed, quantitative specification – and not those calling for such vagaries as a failsafe, simple or inexpensive product – are relevant to the government contractor defense'") (citation omitted).

The defendants argue that the government approved reasonably precise specifications. They reference numerous documents involving the PRS in general and the buckle in particular. The "reasonably precise" standard is satisfied as long as the specifications address, in reasonable detail, the product design feature, alleged to be defective. *See Boyle*, 487 U.S. at 512; *Bailey v. McDonnell Douglas Corp.*, 989 F.2d 794, 799 (5th Cir. 1993) (noting that the specifications need not address the specific design defect alleged, just the specific feature). Defendants alternatively allege that even if the Navy is found not to have approved the PRS during T-34C design process, it did approve the allegedly defective design at issue far before the accident by subsequent testing and use.[8] The 1985 and 1986 FEAT meetings are evidence of this.

We find that the district court's conclusion that the Navy approved reasonably precise specifications for the T-34C's seat harness was appropriate under the facts of this case. Therefore, the government contractor defense applies.[9]

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[8] *See Dowd v. Textron, Inc.*, 792 F.2d 409, 412 (4th Cir. 1986) ("The length and breadth of the Army's experience with the 540 rotor system – and its decision to continue using it – amply establish government approval of the alleged design defects.").

[9] The second element of the defense is satisfied as there was no evidence of a manufacturing defect – i.e., the product conformed to the government specifications. *See supra*. The third element is also satisfied because there is no evidence that Beech knew information about the inadvertent seat harness release that was not known to the government. Evidence exists that the Navy knew as early as 1985 of this inadvertent risk – i.e., the Navy knew at least as much as the contractors. *See infra*.

V. Failure to Warn

In *In re Air Disaster*, this court held that a "conflict between state law and federal policy might arise if there is evidence that the government was involved in the decision to give, or not to give, a warning." 81 F.3d at 575. This is a modified *Boyle* test. State law is displaced if (1) the United States exercised discretion and approved the warnings; (2) the contractor provided a warning that conformed to the approved warnings; and (3) contractor warned about dangers it knew, but the government did not. *See id.*

The district court found that the first element was satisfied in that the Navy approved, changed and edited warnings in the T-34C NATOPS Flight Manual. Although the manual contained no express evaluation of a warning of the specific hazard of inadvertent seat release, the government contractor defense applies because the Navy exercised discretion in approving warnings in the flight manual. *See Tate II*, 140 F.3d at 660 (holding that the government contractor defense applies in "situations in which the government makes the informed decision not to include a specification or require a warning because, in the government's view, one would be unnecessary or problematic."). Inadequacy is not an issue when it is the government's warning in the first place. The district court found that there was no failure to warn claim under Texas law either because the Navy added a release warning to the flight manual 3 years before the incident in this case.

Plaintiff argues that BASI and Beech were under a continuing duty to advise and warn the Navy because

they continued to exercise the necessary degree of continuing control, thus creating a continuing duty to advise. *See Bradshaw v. Bell Helicopter*, 594 S.W.2d 519, 531-32 (Tex. Ct. App. – Corpus Christi 1979, writ ref'd n.r.e.) (finding that because the defendant retained significant control over the safety of the product, it has assumed the duty to warn). The degree of control necessary to give rise to a continuing duty to advise was not present in this case. *Cf. Perez v. Lockheed Corp.*, 88 F.3d 340, 341 (5th Cir. 1996) (no retention of control as in *Bradshaw*).

Defendants rebut this argument with the undisputed fact that the Navy knew about the problem at least 10 years before the accident. Existence of a duty to warn is a question of law and since the Navy knew, contractors had no duty to warn. Contractors need not warn the victim directly. *See Tate II*, 140 F.3d at 660 ("Under the third conditions of both the *Boyle* and *Tate I* analyses, the government contractor must show that it 'warned the United States of the dangers in the equipment's use about which the contractor knew, but the United States did not.'") (citations omitted). Since the Navy knew of the danger of the "uncommanded seat release" on the T-34C's PRS, the contractors did not have a duty to warn of that danger.

Defendant BASI argues that since the release problem was an alleged design defect, and since BASI is a maintenance contractor, it has no duty to warn. *See Firestone*, 927 S.W.2d 608, 613-14 (Tex. 1996). They did not voluntarily undertake to warn by their attendance at the FEAT meetings. We agree with BASI's statement that "It stands logic on its head to argue that the Navy's disclosure of a design

defect at a meeting BASI attended as a maintenance representative triggered a duty of BASI to warn the Navy about the same problem."

VI. Negligent Maintenance

Plaintiffs claim that BASI was negligent in maintaining the victim's aircraft because it failed to check for interference between the control stick and buckle and the negligent failure to replace the canopy.[10] Because BASI did not manufacture the stick, its duty of care arises from its contract with the Navy to perform maintenance services. Pursuant to *Colonial Sav. Ass'n v. Taylor*, 544 S.W.2d 116 (Tex. 1976), BASI can only be liable if the victim in this case declined to make his own inspection of the stick, in reliance on the BASI inspection. *See Taylor*, 544 S.W.2d at 120. The victim inspected the stick. The district court also correctly ruled that plaintiff presented no evidence

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[10] Plaintiffs also claim negligent maintenance in relation to BASI's failure to replace the canopy of the aircraft when it became brittle. Plaintiffs assert that a fact issue with regard to the brittleness of the canopy – i.e., whether BASI complied with the government specifications. The district court held that an expert's speculation is insufficient to create a fact question. Plaintiff's expert testified that further studies were needed to determine the cause of the canopy's failure to keep the victim in the cockpit. These studies were never done. Defendants respond by arguing that plaintiff's expert could not even conclude that the canopy was what caused the injury. Even assuming causation, there is no evidence of BASI being negligent – it was within specifications. The T-34C component maintenance was to be done in accordance with the T-34C maintenance manual that was written by the Navy.

that BASI's failure to inspect the control stick was a proximate cause of the accident.

CONCLUSION

Because we find that the government contractor defense applies and that no genuine issue of material fact exists, we affirm the decision of the district court.

AFFIRMED

THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

LINDA KERSTETTER V. PACIFIC SCIENTIFIC COMPANY, ET AL.	§ § § § §	C.A. NO. C-96-512

ORDER GRANTING MOTIONS FOR SUMMARY JUDGMENT

The defendants' motions for summary judgment (DEs 65,66,67) are GRANTED. A written opinion will follow this order.

ORDERED this 31 day of March, 1999.

/s/ H.W. Head, Jr.
H.W. HEAD, JR.
UNITED STATES
DISTRICT JUDGE

THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

LINDA KERSTETTER	§	C.A. NO. C-96-512
V.	§	
PACIFIC SCIENTIFIC	§	
COMPANY,	§	
ET AL	§	

OPINION ON ORDER GRANTING DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

This action arises from a tragic accident in which the decedent, United States Navy Lt. David J. Huber, was ejected unintentionally from a Navy T-34 aircraft while he was instructing a training flight. The plaintiff, the decedent's mother, has asserted various claims under Texas law against Beech Aircraft Corporation (the manufacturer of the T-34C), Pacific Scientific Company (the manufacturer of the T-34C's pilot restraint system), and Beech Aerospace Services, Inc. (the maintenance contractor for the T-34C).[1] All of the defendants moved for summary judgment on the basis of the government contractor defense. The Court granted the defendants' motions on

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[1] Additional defendants were dismissed by the Court upon motion of the plaintiff (DEs 64, 69). At this time, Raytheon Aircraft Company and Raytheon Aerospace Company remain defendants to the suit. Those defendants, however, are merely successors of Beech Aircraft Company and Beech Aerospace Services, Inc. For purposes of clarity and simplicity, this order will refer to the manufacturer of the T-34C simply as "Beech," to the manufacturer of the pilot restraint system simply as "Pacific Scientific," and to the maintenance contractor for the T-34C simply as "BASI."

March 31, 1999 (DE 121). The Court submits this opinion in support of its order granting summary judgment.

I. INTRODUCTION

The stipulations of the parties and the summary judgment evidence establish the following agreed or unrebutted facts. Lt. David J. Huber was an instructor pilot assigned to Training Squadron Twenty-Eight at the Naval Air Station (NAS) in Corpus Christi, Texas (DE 109 p1).[2] On February 14, 1995, Lt. Huber flew a training flight in which a student pilot, Ens. Joseph W. Moorhouse, practiced spins and spin recovery techniques (DE 109 pp1-2). The training flight occurred in a Navy T-34C trainer aircraft identified as Bureau Number (BUNO) 161826 (DE 109 p2). The training flight took off from NAS Corpus Christi at approximately 4:00 p.m. (*Id.*).

During Navy spin recovery maneuvers, the student places the aircraft in a nose-down position, which creates negative G-forces toward the rear of the aircraft (DE 109 pp3-4). During one of these spin recovery maneuvers, Lt. Huber was ejected unintentionally from BUNO 161826 (DE 109 p4). The T-34C aircraft does not have an ejection

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[2] Throughout this order, citations to "DE" refer to particular docket entries in the Court's record. Citations to "DX" refer to the defendants' joint exhibits in support of their motions for summary judgment, located at DEs 65-67. Citations to "PX" refer to the plaintiff's exhibits in support of her response to the motions for summary judgment, located at DE 71.

seat. Lt. Huber was ejected when negative G-forces created by the spin recovery maneuver propelled him through the canopy and out of the aircraft (DX B p02236).

Lt. Huber survived the initial ejection from the aircraft, and made two radio calls indicating that he was in his parachute over the Gulf of Mexico off the coast of Padre Island (DX B p02228-9). Lt. Huber's radio calls occurred at approximately 4:54 p.m. (*Id.*). Ens. Moorhouse also made a radio call indicating that he believed his instructor had bailed out, and that he was bailing out also (DX B p02229). Ens. Moorhouse then turned the aircraft to the north and bailed out (DE 109 pp4-5).

Approximately twenty minutes after Lt. Huber made his radio calls, a search and rescue operation launched for the mishap area from NAS Corpus Christi (DE 109 p5). The search and rescue operation recovered Ens. Moorhouse, who had sustained substantial nonfatal injuries, at approximately 5:32 p.m. (*Id.*; DX C p02488). The search and rescue operation continued to search for Lt. Huber until approximately 10:53 p.m., when deteriorating weather conditions forced the operation to pause (DE 109 p5). The operation resumed at approximately 6:30 a.m. on February 15, 1995 (*Id.*). At approximately 3:30 p.m., search and rescue personnel found Lt. Huber's body without his parachute about one mile offshore (DE 109 pp5-6). Lt. Huber was pronounced dead at the scene. (*Id.*).

Following the accident, the Chief of Naval Education and Training conducted a thorough investigation and issued a report to the Judge Advocate General ("the JAG

report," DX B). The JAG report explains the most probably scenario to cause this accident. The T-34C is equipped with a pilot restraint harness with five straps that come over the pilot's shoulders, around his hips, and between his legs to fasten into a rotary buckle at the pilot's lap (DX B p02209). The harness is released by twisting the rotary buckle 1/8 of a turn in a clockwise direction (*Id.*). If the harness is adjusted properly, the buckle is located underneath the pilot's life preserver unit so that it cannot come into contact with the aircraft's control stick (DX B p02211). When the buckle is in front of the life preserver unit, it is possible when the control stick is in the full-aft position (as occurs during spin entry) for the control stick to contact and inadvertently release the harness (*Id.*). Because Lt. Huber's harness was found to be working properly upon recovery of the aircraft, Lt. Huber's harness probably released inadvertently when Ens. Moorhouse pulled the control stick to the full aft position to enter a spin (DX B p02228, 02236). When Ens. Moorhouse then put the aircraft in a nose-down position to recover from the spin, the resulting negative G-forces propelled Lt. Huber from the aircraft (DX B p02236). Although Lt. Huber survived the ejection and his parachute initially functioned properly, Lt. Huber came out of his parachute prematurely for reasons unknown and died from blunt force trauma upon impact with the water (*Id.*). Lt. Huber did not drown, and the 24-hour delay between the accident and the recovery of his body did not contribute to his death (*Id.*; DE 109 p7).

II. STATEMENT OF THE CASE

The plaintiff brings suit against Beech, Pacific Scientific, and BASI under various theories of relief (see DEs 41, 71 pp2-3). Primarily, the plaintiff contends that the pilot-restraint system in the T-34C had several design defects that caused Lt. Huber's death. First, the plaintiff contends that the pilot restraint system's rotary buckle had raised vertical vanes that permitted the control stick to release the buckle when pulled into the full aft position and moved laterally. Second, the plaintiff contends that the buckle should have been equipped with a guard to prevent contact between the control stick and the buckle. Third, the plaintiff contends that the size, shape, and placement of the control stick permitted contact between the control stick and the buckle. The plaintiff claims that Beech and Pacific Scientific should be held liable for these design defects under theories of negligence, strict products liability, and breach of warranty. The plaintiff also claims that Beech and Pacific Scientific should be held liable for negligent manufacture, inspection, and failure to warn.[3]

The plaintiff's claims against BASI vary significantly from those against Beech and Pacific Scientific. The plaintiff claims that BASI negligently maintained BUNO 161826 in several respects. First, the plaintiff claims that BASI failed to replace the rear canopy in a timely manner, which caused the canopy to become brittle and allowed Lt. Huber to be propelled through the canopy and out of

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[3] The plaintiff has withdrawn her claims under the Texas Deceptive Trade Practices Act (DE 71 p51).

the aircraft. Second, the plaintiff claims that BASI failed to inspect the control stick clearance and seat harness condition during preflight inspections as required by the Navy. Third, the plaintiff claims that BASI failed to warn Lt. Huber of the dangerous propensity of the T-34C's pilot restraint system to come unfastened during flight.

All defendants have moved for summary judgment. Beech and Pacific Scientific contend primarily that the government contractor defense shields them from liability on the plaintiff's design defect and failure to warn claims. Beech and Pacific Scientific also contend that there is no evidence to support the plaintiff's negligent manufacture, inspection, and failure to warn claims. BASI contends primarily that there is no evidence to support the plaintiff's negligent maintenance, inspection, and failure to warn claims, and also that it is shielded from liability by the government contractor defense.

As the parties moving for summary judgment, the defendants bear "initial responsibility of informing the district court of the basis for [their] motion, and identifying those portions of 'the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any,' which [they believe] demonstrate the absence of a genuine issue of material fact." *Celotex v. Catrett*, 106 S.Ct. 2548, 2553 (1986), quoting F.R.C.P. 56. The defendants also bear the initial burden on summary judgment to come forward with evidence to establish the elements of the government contractor defense, because they bear the ultimate burden to establish that defense at trial. *Celotex* at 2552. The plaintiff bears the initial burden on summary judgment to come forward with evidence to

establish the elements of her claims, because she bears the ultimate burden to establish those claims at trial. *Id.*

III. THE GOVERNMENT CONTRACTOR DEFENSE

A. The *Boyle Decision*

The Supreme Court first articulated the broad outlines of the government contractor defense in *Boyle v. United Technologies Corp.*, 108 S.Ct. 2510 (1988). David Boyle was a United States Marine helicopter pilot who drowned when he was unable to escape from his helicopter following a water crash. The plaintiff sued the manufacturer of the helicopter claiming that the escape hatch was designed defectively because it opened outward, and thus would not open under water pressure. The jury returned a verdict in favor of the plaintiff, but the Court of Appeals for the Fourth Circuit reversed the judgment because if found that the helicopter manufacturer was immune from liability under the federal common law government contractor defense.

The Supreme Court agreed with the court of appeals that federal common law should, in some instances, shield contractors from liability when they build equipment for the government. The Court concluded that the government contractor defense was a proper exercise of the very limited power of federal courts to create common law, because the operation of state law to hold military contractors liable for design defects in military products presents a significant conflict with uniquely federal interests. The Court first reasoned that a suit between an individual and a government contractor can affect

uniquely federal interests even though the government is not a party, because the imposition of liability on the government contractor could cause the contractor either to decline to manufacture the design specified by the government or to raise its price. *Boyle* at 2515-16. The Court next reasoned that state law in some instances presents a significant conflict with uniquely federal interests because "[t]he financial burden of judgments against the contractors ultimately would be passed through, substantially if not totally, to the United States itself, since defense contractors will predictably raise their prices to cover, or to insure against, contingent liability for the Government-ordered designs." *Boyle* at 2518. These higher prices would significantly affect the government's discretion to select the appropriate design for military equipment, which "often involves not merely engineering analysis but judgment as to the balancing of many technical, military, and even social considerations, including specifically the trade-off between greater safety and greater combat effectiveness." *Id.* The Court concluded that "state law which holds Government contractors liable for design defects in military equipment does in some circumstances present a 'significant conflict' with federal policy and must be displaced." *Id.*

The Court then considered in what circumstances state law must be displaced. The Court created a three-part test to distinguish those cases in which the government contractor defense is appropriate from those in which it is not:

> Liability for design defects in military equipment cannot be imposed, pursuant to state law, when (1) the United States approved reasonably

> precise specifications; (2) the equipment conformed to those specifications; and (3) the supplier warned the United States about the dangers in the use of the equipment that were known to the supplier but not to the United States. The first two of these conditions assure that the suit is within the area where the policy of the "discretionary function" would be frustrated – i.e., they assure that the design feature in question was considered by a government officer, and not merely by the contractor itself. The third condition is necessary because, in its absence, the displacement of state tort law would create some incentive for the manufacturer to withhold knowledge of risks, since conveying that knowledge might disrupt the contract but withholding it would produce no liability.

Boyle at 2518-19.

B. Subsequent Development of the Government Contractor Defense

As in this case, the primary issue in most cases following *Boyle* has been the meaning of the first element of the *Boyle* test – the requirement that the United States approve reasonably precise specifications. This element actually raises two questions: (1) what constitutes government approval; and (2) what are reasonably precise specifications?

Post-*Boyle* decisions have made clear that the government need not itself *prepare* the specifications for a product in order to *approve* those specifications. Even if the

government delegates design responsibility to the contractor, the government still may approve the final specifications by conducting substantive review or evaluation of the relevant design features. *Trevino v. General Dynamics Corp.*, 865 F.2d 1474, 1480 (5th Cir. 1989). The level of government review must be "more than a rubber stamp," or in other words more than a "review to determine that the design complies with the general requirements initially established by the government." *Id.* The most significant factors to be considered in assessing the sufficiency of government approval include whether the government evaluated the contractor's detailed drawings at various stages of design, whether the government criticized the contractor's design, and whether the government extensively tested prototypes before accepting the design. See *In re Air Disaster at Ramstein Air Base, Germany*, 81 F.3d 570, 574 (5th Cir. 1996); *Stout v. Borg-Warner Corp.*, 933 F.2d 331, 336 (5th Cir. 1991). As one court has expressed the salient aspect of this test, the government approves the final design of a product whenever that product is the result of a "continuous back and forth" between the contractor and the government. *Harduvel v. General Dynamics Corp.*, 878 F.2d 1311, 1320 (11th Cir. 1989).

The second component of *Boyle*'s first element requires the specifications approved by the government to be "reasonably precise." The significance of this component is its requirement that the government approve specifications that show in reasonable detail how to construct the particular design feature alleged to be defective. A contractor will not be shielded from liability when it builds a product that conforms only to very broad

government specifications. See *Trevino* at 1480. A contractor also will not escape liability if the government delegates discretion to the contractor to design the allegedly defective feature merely because the government approves reasonably precise specifications for other features of the product. See *Bailey v. McDonnell Douglas Corp.*, 989 F.2d 794, 799 (5th Cir. 1993). Contrary to the plaintiff's assertion, however, the specifications need not address the specific *defect* alleged in the case. (See DE 71 at 6.) The *Boyle* test requires only that the government evaluate the design *feature* in question. *Boyle* at 2518. The Court concludes that specifications are reasonably precise if they describe in sufficient detail how to construct a particular feature (defects and all), even though the defective nature of the design may have been latent at the time of procurement.

The second element of the *Boyle* test requires the contractor to prove that the product conformed to the specifications approved by the government. Nonconformance means more than that the ultimate design feature does not achieve its intended goal. The alleged defect must exist independently of the design itself, and must result from a deviation from the required military specifications. *Gray v. Lockheed Aeronautical Systems Co.*, 125 F.3d 1371 (11th Cir. 1997), *rev'd on other grounds* 118 S.Ct. 2317 (1998). The purpose of this element is to ensure that the defense does not shield contractors from liability when their products do not conform with the design approved by the government, whether that nonconformity is intentional (as in the case of fraud) or unintentional (as in the case of a manufacturing defect). Extensive government involvement in the design, review,

development, and testing of a product, as well as extensive acceptance and use of the product following production, is evidence that the product line generally conformed with government-approved specifications. *In re Air Disaster* at 575. In addition, absent contrary evidence of nonconformity, government acceptance of a particular product through the issuance of a Form DD250 establishes that the product conformed with government specifications. See *Tate v. Boeing Helicopters*, 921 F.Supp. 1562, 1567 (W.D.Ky. 1996), *affirmed* 140 F.3d 654 (6th Cir. 1998); *Hendrix v. Bell Helicopter Textron Inc.*, 634 F.Supp. 1551 (N.D. Tex. 1986).

Finally, the third element of the *Boyle* test requires contractors to prove that they warned the government of all dangers in the use of the product that were known to the contractor but not to the government. As the Court stated in *Boyle*, the purpose of this element is to maintain the incentive that ordinarily would be imposed by state law to warn the government of a product's known dangers. *Boyle* at 2519. The purpose of this element is *not* to create an incentive to discover latent defects in a product designed for the government. The government contractor defense does not require a contractor to warn the government of defects about which it only *should have* known. *Trevino* at 1487 ("After *Boyle* a government contractor is only responsible for warning the government of dangers about which it has actual knowledge").

C. The Plaintiff's Interpretation of the Government Contractor Defense is Mistaken

The plaintiff proffers an interpretation of the government contractor defense that is central to the legal issues in this case, but that differs fundamentally from the defense as it is explained by *Boyle* and subsequent decisions. The plaintiff argues that for the government contractor defense to apply, the government must have considered and rejected the safer alternative designs proposed by the plaintiff, or at least must have itself proactively limited the discretion of the contractor to include a safer alternative design. Although this argument might be persuasive if presented to the Supreme Court or to Congress, the Court finds that this interpretation runs afoul of the Supreme Court's decision in *Boyle*, the Fifth Circuit's decision in *Stout*, the Sixth Circuit's decision in *Tate v. Boeing Helicopters*, 140 F.2d 654 (6th Cir. 1998) (*"Tate II"*), and the Third Circuit's decision in *Carley v. Wheeled Coach*, 991 F.2d 1117 (3d Cir. 1993).

In *Boyle*, the Supreme Court considered and rejected an alternative formulation of the government contractor defense that is virtually identical to that proposed by the plaintiff. The alternative defense rejected by the Court would have precluded suit only if

> (1) the contractor did not participate, or participated only minimally, in the design of the defective equipment; *or* (2) the contractor timely warned the Government of the risks of the design an notified it of alternative designs reasonably known by it, *and* the Government, although forewarned, clearly authorized the

> contractor to proceed with the dangerous design.

Boyle at 2519. The Court concluded that this rule, while perhaps a reasonable rule of tort law, did not sufficiently protect the federal interest in the selection of appropriate military equipment. The Court stated:

> [t]he design ultimately selected may well reflect a significant policy judgment by Government officials whether or not the contractor rather than those officials developed the design. In addition, it does not seem to us sound policy to penalize, and thus deter, active contractor participation in the design process, placing the contractor at risk unless it identifies all design defects.

Id. Because *Boyle* makes clear that contractors must warn the government of all known defects, this last sentence can only mean that the defense applies even when the contractor did not warn the government of latent defects (or in other words, defects that neither the contractor nor the government considered at all).

The Fifth Circuit reached the same conclusion in *Stout*. The plaintiff in that case sustained injuries from an air conditioner fan that could have been prevented by a safety device such as a wire screen. The Army's initial specifications for the air conditioner neither required nor prohibited such a device, and although both the Army and the contractor evaluated and modified the design during the design process, no one added such a device. The plaintiff explicitly argued that the government contractor defense should not apply because the Army's specifications did not affirmatively *prohibit* a safety

device, and thus the contractor could have complied both with Army specifications and with the state-imposed duty of care. *Stout* at 334-35. The court rejected this argument and applied the government contractor defense. Although there was evidence that the Army ultimately rejected the addition of a wire screen (after the plaintiff's accident), the court of appeals looked only to the government's extensive involvement in the design process and the fact that the final design contained no safety device to conclude that the defense should apply.

The Sixth Circuit reached the same conclusion in *Tate II*. In that case, the plaintiff claimed that the manufacturer of a helicopter negligently failed to include a warning of a particular hazard in the operator's manual. Although there was evidence that the government and the contractor extensively reviewed the warnings included in the manual, there was no evidence to show that either the government or the contractor considered (or was even aware of) the particular hazard that caused the accident. The plaintiff sought to avoid the government contractor defense on the grounds that the government's review had not focused on the particular hazard involved in the case, and thus did not preclude the warning proposed by the plaintiff. The court of appeals concluded:

> [a] requirement that government review focus on a particular hazard or warning simply is not analogous to a requirement that the government review focus on a particular design. In the context of design defects, when the government has reviewed and approved a design, we presume that it has weighed and accepted all the risks associated with that design choice. We do not

> require evidence that the government has addressed each of those hazards individually.

Tate II, 140 F.3d at 658.

Finally, the formulation of the defense proposed by the plaintiff is most clearly rejected by the Third Circuit in *Carley*. In that case the plaintiff was injured when an ambulance flipped over because it had an excessively high center of gravity. The government's specifications for the ambulance stated that its center of gravity should not exceed 43 inches. The contractor complied with that specification, although it could have placed the ambulance's center of gravity lower without violating the specification. The court of appeals applied the government contractor defense, concluding that

> [a]lthough these guidelines permitted Wheeled Coach to place the center of gravity anywhere below the maximum height of forty-three inches, the government need not deprive the manufacturer of all discretion pertaining to a particular design feature in order for the government contractor defense to apply.

Carley at 1125. See also *Russek v. Unisys Corp.*, 921 F.Supp. 1277 (D.N.J. 1996) (discussing application of defense when government does not affirmatively prohibit safer alternative design but approves specifications that do not contain safer design).

On the basis of these cases, the Court rejects the formulation of the government contractor defense proposed by the plaintiff. The defense applies when the elements of the *Boyle* test are satisfied. The first element is satisfied when the government approves reasonably precise specifications. it is not necessary that the government

affirmately reject a safer alternative design, or even proactively limit the contractor's discretion to incorporate a safer design. The first element is satisfied when the reasonably precise specifications do not include the safer design, and the government approved those specifications.

IV. SUMMARY JUDGMENT EVIDENCE

The uncontroverted summary judgment evidence establishes the following material facts. The T-34 aircraft is a tandem two-seat, single-engine basic trainer aircraft (DX E p2). Beech manufactured the T-34B aircraft for the Navy from 1954 until 1957 (*Id.*). The T-34B utilized a piston engine (*Id.*) The Navy continued to use the T-34B as its basic trainer aircraft into the 1970s (*Id.*).

In November of 1972, the Chief of Naval Operations established a Specific Operational Requirement for the development of a turboprop-powered primary trainer aircraft to replace the T-34B (DX H pp00253, 00327). Beech submitted a proposal to the Navy to produce the turboprop trainer by modifying the Navy's existing fleet of T-34Bs (*Id.*). In April of 1973, the Navy and Beech negotiated a contract for the modification and flight test of two T-34B prototypes (identified as YT-34Cs), so that the Navy could gain feasibility data to help assess whether to continue with the modification project (DX P p03175).[4]

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[4] Although this contract cannot be found, the parties do not dispute that it existed and that its essential terms required Beech to modify two T-34Bs by adding a turboprop engine, so that the Navy could flight test the modified aircraft. More

The contract for the T-34B modification project required that the cockpit geometry of the YT-34C be identical to the cockpit geometry of the T-34B (DX D p3). The preliminary model specification for the YT-34C required the flight station controls and the seat belt and shoulder harness to be the "[s]ame as T-34B" (DX Q pp 03213, 03222). The preliminary model specification for the YT-34C also set forth the exact degree of movement of the control stick and other aircraft controls (DX Q p 03195). During this preliminary modification project, the Defense Contract Administrative Services Office had engineering, industrial, quality, and flight operations personnel on-site at the Beech plant (DX P p03176). Pursuant to the Navy's specifications, Beech modified and presented two aircraft, designated the YT-34C, to the Navy by December 1973 (DX D p2, DX H p00253).

Over ten days in December of 1973, the Naval Air Test Center conducted Phase I of its Preliminary Evaluation of the YT-34C at the Beech facility in Wichita, Kansas (DX H p00253). The purpose of the evaluation was to "determine the potential of the YT-34C, airplane to fulfill the requirements of the Naval Air Training Command's primary flight training syllabus" (*Id.*). The members of the evaluation team included military personnel as well as civilian project engineers (DX H p00328). The evaluation team flew twenty-eight flights for a total of fifty-two

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importantly, the amendment to the contract calling out the technical specifications for the modification program, which are more material to this suit than the original contract documents, is in evidence (DX R, Q).

flight hours in the test aircraft (DX H p00254). The evaluation team tested and evaluated numerous aspects of the design and performance of the YT-34C. Material to this case, the evaluation included a human engineering evaluation that focused explicitly on cockpit design (DX H p00257), crew stations (*Id.*), and flight controls (pp00261, 00284-85). The evaluation team specifically observed several deficiencies in the pilot restraint system, including difficulty adjusting the seat height, discomfort from the harness belts and buckle, and the failure of the lap belts to restrain pilots adequately during "negative G" flight (DX H p00257-58). The Navy concluded that these deficiencies should be corrected in the production model aircraft. (*Id.*).

Following the Phase I Navy Preliminary Evaluation, government and Beech engineers worked together to modify the YT-34C's design to resolve the deficiencies observed by the Navy (DX D p3). Changes in the aircraft's design were incorporated into the drawings and the preliminary model specification upon approval by the Navy (*Id.*). The summary judgment evidence does not disclose what, if any, modifications were made to the YT-34C's pilot restraint system before the next phase of Navy evaluations.

Over seventeen days in July and August of 1974, the Naval Air Test Center conducted Phase II of its Preliminary Evaluation of the YT-34C at the Beech facility in Wichita, Kansas (DX I p00388). The purpose of the evaluation again was to "determine the potential of the YT-34C airplane to fulfill the requirements of the Navel Air Training Command's primary flight training syllabus," as well as to assess the degree to which the

deficiencies observed in the Phase I evaluation had been corrected (*Id.*). The members of the evaluation team again included military personnel as well as civilian project engineers DX I p00459). The evaluation team flew forty-six flights for a total of 70.3 flight hours in the test aircraft (DX I p00390). The evaluation again included a human engineering evaluation that examined the cockpit design and crew stations (DX I pp00392-93). The evaluation also specifically addressed the pilot restraint system, concluding that pilot restraint was satisfactory except during repeated inverted spins when the restraint system needed to be retightened (DX I p00440).

The Final Report of the Phase II Navy Preliminary Evaluation, issued on January 17, 1975, contained the deficiency reports collected during both phases of the Preliminary Evaluation by the Navy Flight Test Division (DX I p00546) and Service Test Division (p00596). One of these reports focused on "longitudinal freeplay" in the movement of the aircraft's control stick, and characterized this problem as a minor deficiency that should be corrected in the production design (DX I p00565). Another of these reports focused on the design of the seat and pilot restraint system (DX I pp00702-03). This report concluded that the aircraft's seats were too low, even when adjusted at their highest setting (*Id.*). The report also concluded that the pilot restraint system was uncomfortable, and that it functioned poorly during "negative G" flight because the lap belt rode up over the pilot's hip bones (*Id.*). The report recommended that Beech take corrective action and avoid the deficiencies in the production design (*Id.*). Beech made mechanical adjustments to the flight control system to correct the freeplay in the

longitudinal movement of the control stick (DX D p5), and developed a "seat riser" to raise the seat height to the appropriate level (p3).

Following the Navy Phase II Preliminary Evaluation of the YT-34C, the Navy and Beech contracted on April 4, 1975, for the production of eighteen Model T-34C aircraft (DX S pp05116, 05118). The 1975 production contract required the aircraft to be built according to Detail Specification SD-507-3 (DX S at 05119). That specification required a control stick to be provided in each cockpit (DX T p05277), and specified the exact range of movement of the control stick forward and aft (p05253). The specifications also required that a "lap-type safety belt and shoulder harness shall be provided for each crew member" (DX T p05296). The specification also incorporated a set of design drawings that showed in precise detail how to build every component of the aircraft at issue in this case (DX T pp05238, 05243; DX D p6).

At the time of the 1975 contract, Beech had not yet corrected the deficiencies in the pilot restraint system observed by the Navy in its Preliminary Evaluation. To correct those deficiencies, Beech proposed to add a fifth strap, called a crotch strap, to the four-point harness it had installed on the YT-34C (DX D p5). "The purpose of the crotch strap is to hold the lap belt down so it will take the high crash loads into the large pelvic bone structure" (DX J p02146). Beech described and diagramed the five-point restraint system, including the "quick-release" rotary buckle, in a human engineering report that it provided to the Navy in preparation for further testing (DX D p5; DX J pp02146-47). The human engineering report also described the spatial relationships inside the cockpit

of the T-34C, and specifically noted that the cockpit geometry of the T-34C was the same as the T-34B, which had proven satisfactory throughout its service life (DX J p02115-17).

On December 22, 1975, the Navy accepted Beech's proposal to add a crotch strap to the pilot restraint system and amended the T-34C contract and detail specification accordingly (DX U p04965-66). The contract amendment modified the paragraph of Navy Detail Specification SD-507-3 to read "A pacific Scientific P/N 0101979-01, Lap Belt, Shoulder Harness, crotch strap, with five-point buckle assembly and inertial reel, meeting the requirements of MIL-R-8236. Type MA-6, shall be provided for GL-1 and subsequent aircraft" (*Id.*).[5] With the exception of a minor design change in 1983 that is discussed below, this pilot restraint system is the system that was installed on BUNO 161826.

Over three days in September of 1976, the Naval Air Test Center conducted its Preliminary Evaluation of the T-34C at the Beech facility in Wichita, Kansas (DX K p00761). The purpose of the evaluation was to

> verify that the characteristics of the production T-34C airplane did not vary significantly from those of the prototype YT-34C airplane; to determine the extent to which the deficiencies identified in the YT-34C during the Phase I and Phase II NPE's had been corrected in the production airplane; and to determine the readiness of the

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[5] The plaintiff admits that the requirements of "MIL-R-8236, Type MA-6" are in no way relevant to this case (DE 106 p8).

> T-34C airplane for BIS service acceptance trials. OPEVAL, and for use by the Naval Air Training Command prior to the completion of BIS trials.

(*Id.*). As with the Preliminary Evaluation of the YT-34C, the members of the evaluation team included military personnel as well as civilian project engineers (DX K p00811). The evaluation team flew nine flights each in two production aircraft for a total of 21.1 flight hours (DX K p00762). The evaluation again included a human engineering evaluation that examined the cockpit design and crew stations (DX K pp00765-68). The evaluation also specifically addressed the newly added five-point pilot restraint system, stating:

> [t]he test airplane was equipped with the standard, production restraint system, which incorporated not only the lap and shoulder belts, but also a crotch strap. The restraint system held the pilot in the seat adequately, even during the -2.4g normal acceleration inverted incipient spins. The straps remained tight once cinched by the pilots and did not tend to loosen under load during the spin

(DX K p00799).

Following the Preliminary Evaluation of the T-34C in February of 1976, Beech incorporated numerous changes into the design of the T-34C to correct deficiencies observed by the Navy (DX l p07636). to evaluate the effect of Beech's changes on the spin and spin recovery characteristics of the T-34C, the Naval Air Test Center witnessed a spin demonstration of the T-34C conducted by Beech in February of 1979 in Patuxent River, Maryland (DX L p07634, 07636). The Navy's witnessing team

included military personnel as well as civilian project engineers (DX L p07647). Beech flew three flights for a total of six flight hours during the demonstration (DX L p07638). The Navy's final report of the contractor spin demonstration did not specifically address any of the features of the T-34C involved in this case.

During February through April of 1978, the Naval Air Test Center conducted its own spin evaluation of the T-34C (DX M pp0751-72). The purpose of the evaluation was to "evaluate the spin entry, spin, and spin recovery characteristics of the T-34C airplane to determine that the airplane could be safely flown by students and instructors of the Naval Air Training Command throughout their flight training syllabus" (DX M p07568). The members of the evaluation team again included military personnel as well as civilian project engineers (DX M p07588). The evaluation team performed 115 spins during nine flights for a total of 19.3 flight hours in two test airplanes (DX M p07570). The Navy's spin evaluation again specifically addressed the five-point pilot restraint system, stating:

> [b]oth test airplanes were equipped with the production T-34C restraint system. This system incorporates a crotch strap in addition to the normal shoulder and lap belts. The restraint system held the pilot firmly in the seat and thus significantly improved his ability to control the airplane even at -2.4g in incipient inverted spins. The straps remained tight once cinched by the pilot and did not tend to loosen under load during the spin. **The pilot restraint system in the T-34C airplane is an enhancing characteristic which significantly improves airplane**

controllability during spins and should be included in future designs

(DX M p07583, emphasis added).

During January through March of 1978, the Naval Air Test Center conducted the initial Trials Phase of the Service Acceptance Trials of the T-34C (DX N p01009). The purpose of the evaluation was to "determine the mission and service suitability of the T-34C airplane, evaluate corrections to previously identified deficiencies, and to determine specification compliance" (DX N p01005). The members of the evaluation team again included military personnel as well as civilian project engineers (DX N p01422). The evaluation team performed 41 flights for a total of 78 flight hours, as well as 200 ground test hours (DX N p01006). This trial once again included a human engineering evaluation that "centered on the effect of crew station design on the man-machine interface and compatibility with existing and foreseeable mission requirement" (DX N p01030). The final report of this trial listed the pilot restraint system as an "enhancing characteristic," and stated that "[t]he pilot restraint system significantly improves airplane control capability during spins" (DX N p01385).

In April of 1980, A T-34C crash-landed and came to rest in an inverted position (DX D p7, DX CCp03066). During the accident, the plate on the rotary buckle of the pilot restraint harness had bent, impairing the pilot's ability to escape the cockpit (DX D p7). The Navy asked Pacific Scientific to propose three design modifications to prevent similar accidents in the future (*Id.*; DX CC p 03066). The Naval Air Development Center evaluated the

proposals, and asked Beech to submit an Engineering Change Proposal (ECP) to incorporate the design modification preferred by the Navy (DX CC p 03066). The Navy requested that Beech add an extra screw to the harness buckle to strengthen it against bending for all future production aircraft, and to deliver a retrofit kit for all delivered aircraft (*Id.*). Beech submitted the ECP requested by the Navy (DX DD), and the Navy and Beech subsequently amended their contract to incorporate the ECP into the design drawing of the harness buckle, and to require Beech to install the modified buckle on all future production aircraft (DX EE p00005).

From July of 1981 through March of 1982, the Naval Air Test Center conducted the Final Trials Phase of the Service Acceptance Trials of the T-34C (DX O p01464). The purpose of the evaluation was to "determine the mission and service suitability of the T-34C airplane and to determine specification compliance" (DX O p01455). The members of the evaluation team again included military personnel as well as civilian project engineers (DX O p01928). This final phase of the Service Acceptance Trials focused on nearly every system and function of the airplane, and included an "aircrew systems evaluation . . . to evaluate the mission suitability of the human factors, controls/displays, escape and survival systems, and cockpit environmental factors of the T-34C airplane. This evaluation was completed during 10 hr of ground tests and 2 flights and 3.0 hr of flight time" (DX O p01482). The final report of this trial once again listed the pilot restraint system as an "enhancing characteristic," and stated that "[t]he pilot restraint system significantly

improves airplane control capability during spins" (DX O p01820).

On May 5, 1982, the Navy contracted with Beech for the delivery of 120 additional T-34C airplanes, including BUNO 161826 (DX X p00022-25). That contract originally required the airplanes to conform to Navy Detail Specification SD-507-3-3 (DX X p00025), but the Navy amended the contract to require the airplanes to conform to Navy Detail Specification SD-507-3-3-R2 (DX Y p00008). That specification, which governed the production of BUNO 161826, was signed by the Chief Engineer of the Naval Air Systems Command on December 22, 1982 (DX Z p00147). Detail Specification SD-507-3-3-R2 required a control stick to be provided in each cockpit (DX Z p00200), and specified the exact range of movement of the control stick forward and aft (p00175). The specification also required that "[p]ilot restraint systems meeting the requirements of MIL-R-8236, Type MA-6, consisting of a lap belt, a shoulder harness with an inertial reel, and crotch strap assembly with a five point buckle shall be provided in each cockpit" (DX Z p00216).[6] The specification also stated that

> [t]he drawing set identified by the Beech Aircraft Corporation General Assembly Drawing

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[6] For some reason not explained by the parties or the evidence, this specification reverted to language that described the pilot restraint system whereas previous versions of the specification had called out the system by manufacturer name and part number (see DX W p07049). The drawings incorporated into the specifications, however, remained the same and continued to call out Pacific Scientific Part No. 0101979 (see DX KK).

> 104-000001 Revision A dated 7 April 1980, with changes thereto mutually agreed to by the Government and the contractor, shall specifically define the configuration baseline for all Model T-34C aircraft produced under this specification. In the event of conflict between this specification and the drawing set, this specification shall take precedence. The contractor shall inform NAVAIR of any such conflict as soon as practicable

(DX Z p00168). The drawing set incorporated into the specification included a detailed drawing of the flight control system design (including a sub-drawing of the control stick) (DX II), a detailed drawing of the seat installation design (DX JJ), and a detailed drawing of the seat harness design (including a sub-drawing of the rotary buckle assembly) (DX KK) (see generally DX D p6). Every design drawing incorporated into the specification was reviewed and approved by the Navy through design review sessions and product testing (DX Dp6; PX E-1 pp67-69, 73-74, 86-87, 89-91, 108). Once approved, no drawing could be modified without the express approval of the Navy (DX D p6; DX Z p00168).

Beech delivered BUNO 161826 to the Navy on August 31, 1983 (DX BB p00244). The Navy inspected BUNO 161826 through its Procurement Quality Assurance program, and issued a Form DD250 stating that the airplane conformed to contract requirements (*Id.*).

Following the delivery of the T-34Cs to the Navy, the Navy held annual Field Engineering Action Team (FEAT) meetings to discuss engineering design and maintenance issues pertaining to the T-34C (DX D p8). Representatives

from the Navy, Beech, and the maintenance contractor for the T-34C were present at the FEAT meetings (*Id.*).

At the 1985 FEAT meeting, Beech heard reports for the first time of "uncommanded seat harness release" occurring in the T-34C (*Id.*). The Navy Training Wing Five reported that "[d]uring aerobatic maneuvers a full aft control stick deflection will sometimes contact the buckle release causing the pilot to become unrestrained in the cockpit" (DX FF p03043). The Navy assigned responsibility for this problem to the Navy training wings, and recommended that "[t]he training wings will advise their pilots of this problem and monitor for future occurrence" (*Id.*). The Navy also stated that "[i]f the problem persists, redesign of the buckle may be necessry" (*Id.*). The Navy did not request that Beech take any action on this problem (DX Dp8).

At the 1986 FEAT meeting, the Navy again placed "uncommanded seat harness release" on the agenda. A Navy engineer at that meeting asked the Navy Training Command and Navy Maintenance Officer to submit more detailed information on the frequency and severity of the problem before further action would be taken (DX GG p03056). The item was left open following the 1986 FEAT meeting (*Id.*), and Beech did not hear again of "uncommanded seat harness releases" until after the accident at issue in this case (DX D p9).

Sometime prior to the accident involved in this case, the Navy instructed its T-34C pilots to position their harness buckles under their life-preserver units to prevent inadvertent release of the pilot restraint system (PX A Att3 p3; DX B pp02211, 02448; DX G p180). Navy

personnel also created a form on which pilots could report occurrences of inadvertent harness release (DX B 02534, 02615-36). Between March and November of 1992, T-34C pilots in the Navy's Training Squadron Twenty-Seven reported 24 incidents of inadvertent restraint harness release (*Id.*). There is no evidence to show that the Navy took any other actions in response to this problem before the accident involved in this case.

Following the accident involved in this case, the Commander of the Navy Training Squadron in Corpus Christi informed the Commander of Naval Operations that the potential for inadvertent release of the pilot restraint system on the T-34C posed a "severe inflight hazard" (DX HH p02886). The Commander wrote further that "this [hazard report] brings to light a deficiency that has been accepted for too many years, and the risk management equation is now clearly tipped in favor of 'must fix' " (DX HH p02887). The Navy ultimately responded to the problem by removing the raised vertical vanes from the rotary buckle, altering the shape of the control stick, and installing a guard over the buckle to minimize control stick-buckle contact (PX A p3).

V. DISCUSSION

A. Manufacturing Defect and Negligent Inspection

The plaintiff has produced no evidence to show that a manufacturing defect contributed in any way to the accident at issue in this case. Following the accident, the Navy found that Lt. Huber's restraint harness did not

malfunction, and that there was no evidence of mechanical failure (DX B p02228). The plaintiff's expert in aerospace engineering, Dr. Ronald O. Stearman, testified in deposition that no manufacturing defect caused this accident (DX G p194). Because there is no evidence to create a genuine issue of material fact, the Court grants summary judgment in favor of the defendants on the plaintiff's manufacturing defect claims.

For the same reason, the Court grants the defendants' motion for summary judgment on the plaintiff's negligent inspection claims. A claim for negligent inspection presumes the existence of a manufacturing defect that should have been discovered through careful inspection. To the degree that the plaintiff's claim is for negligent failure to discover a design defect through inspection, this claim is displaced by the government contractor defense as discussed below.

B. Design Defect (Negligence, Strict Liability, and Warranty)

When the three elements of the government contractor defense are satisfied, the defense displaces contractor liability for the defective design of a product under any theory of state law, including negligence, strict liability, and breach of warranty, *Smith*, 366 F.2d at 137. The defense immunizes subcontractors as well as prime contractors who provide equipment to the government. *Tate II*, 140 F.3d at 657 n.2; *Maguire v. Hughes Aircraft Corp.*, 912 F.2d 67 (3d Cir.1990). In this case, the government contractor defense immunizes Beech and Pacific Scientific from liability on the plaintiff's design defect claims.

Because the primary issue in this case is the first element of the government contractor defense, the Court will address only briefly the second and third elements of the defense. There is little dispute that the second element of the government contractor defense is satisfied. As noted above, there is no evidence to show that a manufacturing defect contributed to the accident in this case. There is no evidence to show that the T-34C generally, or BUNO 161826 specifically, failed to conform to government specifications. During the Initial Trials Phase and the Final Trials Phase of the Navy's Service Acceptance Trials, the Navy focused its attention explicitly on determining the specification compliance of the T-34C. The Initial Trials Phase involved 78 hours of flight testing and 200 hours of ground testing, and the Final Trials Phase stretched over nine months and focused specifically on human factors for 3 hours of flight testing and 10 hours of ground testing. The Navy accepted delivery of BUNO 161826, and expressed through the issuance of a Form DD250 that the airplace complied with contract specifications. The Navy then used the airplane for 12 years prior to this accident without discovering any nonconformity with specifications that is revealed by the summary judgment evidence. This evidence, uncontroverted by evidence showing nonconformity with specifications, is sufficient to establish the second prong of the government contractor defense.

The evidence also establishes that the third element of the government contractor defense is satisfied. There is no evidence to show that Beech knew of the risk of inadvertent seat harness release prior to the procurement of BUNO 161826. The only evidence in the record hearing

on when Beech first learned of the risk is the sworn statement of James Hutchens that Beech first learned of the problem *from the Navy* at the FEAT meeting in 1985 (DX D). There is some evidence to show that Pacific Scientific knew of the general propensity of rotary buckles to release inadvertently when struck by foreign objects, from its experience with a similar rotary buckle it manufactured for an Army helicopter that was involved in an accident in the early to mid-1980s (see PX E-3 pp30-34). But even if Pacific Scientific knew of the general risk, the evidence shows that the Navy knew of the specific risk in the T-34C by 1985, ten years before the accident in this case. The evidence establishes that at all times material to this lawsuit, the Navy knew as much about the risk of inadvertent release of the harness as Beech or Pacific Scientific.

The central issue in this case is the first element of the government contractor defense. The unrebutted summary judgment evidence conclusively establishes that the government approved reasonably precise specifications for the design features at issue in this case. The evidence shows that the government was intimately involved in the design, testing, and review of the T-34C from the very inception of the product, and that the Navy focused its attention repeatedly on the design of the pilot restraint system, the movement of the control stick, and the spatial relationship of equipment in the cockpit.

First, the T-34C originated as a modification to the T-34B, an aircraft the Navy had been using to train pilots for twenty years. The specifications for the T-34B modification project were incorporated into the contract for

the project and required Beech to include the same control stick, the same pilot restraint system, and the same cockpit design that it included on the T-34B.[7] The Navy's experience with this equipment at the time it approved its continued use on the YT-34C may itself be sufficient to sustain the government contractor defense. *See Lewis v. Babcock Indus., Inc.*, 985 F.2d 83 (2d Cir. 1993); *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986).

Second, the government was extensively involved in an approval process that included over eight years of redesigning and testing the YT-34C and T-34C. The summary judgment evidence reveals a clear pattern of government-contractor interaction: Beech would deliver an airplane to the Navy built according to a set of specifications; the Navy would test the airplane and identify specific design deficiencies; Beech, with input from the Navy, would make modifications to the design; and the Navy would test the modifications to determine the extent to which they corrected the deficiencies. This process involved at least six discreet rounds of testing, and entailed hundreds of hours of flight and ground tests. Throughout the process, the government had personnel at the Beech facility to interact with Beech engineers in the modification of the T-34C design. This testing process reveals that the Navy was integrally involved in the review and approval of the T-34C's design.

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[7] The plaintiff objects that these specifications should not be considered *government* specifications because they were drafted by Beech on Beech letterhead. This argument is incorrect, because *Boyle* establishes that the government contractor defense applies even when the government approves specifications created by the contractor.

Third, the Navy's review and approval of the T-34C's design included the features at issue in this case. All of the design features at issue in this case – the shape and location of the control stick, the spatial arrangement of the cockpit, and the unguarded vertical vanes on the rotary buckle of the pilot restraint system – would have been obvious to any Navy test pilot who flew the plane during the eight-year approval process. It strains imagination to argue that the Navy did not approve the design of those features, when the Navy approved the final design of the aircraft by accepting it into service and those features were an obvious part of that design. The *defective nature* of the features may have been latent to the Navy as well as to the contractors, but the features themselves were obvious to anyone who flew the T-34C.

Furthermore, the Navy specifically addressed its attention to the design features at issue in this case throughout the approval process. Every Navy test evaluated the pilot restraint system, and every Navy test except the Spin Evaluation evaluated human factors and cockpit design. When the Navy was dissatisfied with the movement of the control stick, Beech made mechanical adjustments to the flight control system that satisfied the Navy's demands. When the Navy was dissatisfied with the placement of the seat, Beech adjusted the height of the seat to satisfy the Navy's demands. Most importantly, when the Navy *twice* was dissatisfied with the pilot restraint system, Beech and Pacific Scientific added a crotch strap and strengthened the rotary buckle to satisfy the Navy's demands. The Navy even required the exact pilot restraint system at issue in this case in one set of

specifications, and referred to that system as an "enhancing characteristic" after several rounds of flight tests. This evidence conclusively demonstrates that the Navy focused its attention on features such as the buckle on the pilot restraint system, the movement of the control stick, and the spatial relationships within the cockpit. The fact that the Navy did not fully appreciate the risks latent in the designs of the features it approved does not mean that the Navy did not approve the designs.

The result of this "continuous back and forth" between the Navy and its contractors was the final detail specification under which BUNO 161826 was constructed. That specification incorporated an extensive set of engineering drawings that showed in minute detail how to construct the features at issue in this case. There is unrebutted summary judgment evidence that the Navy routinely evaluated and approved these drawings, and that the contractor could not make changes to the drawings without Navy approval.[8] Moreover, even if the Navy did not review the individual drawings of the designs at issue in this case, the Navy established its approval of those designs through its extensive testing and experience with the T-34C.

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[8] The plaintiff objects to these statements by James Hutchens in his affidavit (DX D) and deposition (PX E-1) as conclusory. The Court disagrees. Mr. Hutchens' assertion that the Navy reviewed Beech designs as a matter of routine is not conclusory, and is not rendered conclusory by his inability to state in detail, 15 to 20 years after the fact, that the Navy reviewed a particular drawing or a particular design.

In the face of this overwhelming evidence of government involvement in the design of the T-34C, the plaintiff makes several arguments to avoid the government contractor defense. First, relying on a dictum from *Boyle*, the plaintiff argues that the defense should not apply because the Navy merely purchased the pilot restraint system and the control stick "off the shelf." The Court wrote in *Boyle* that if "a federal procurement officer orders, by model number, a quantity of stock helicopters that happen to be equipped with escape hatches opening outward, it is impossible to say that the government has a significant interest in that particular feature." *Boyle* at 2517. The plaintiff misapplies this principle to the facts of this case. A government *procurement officer* did not order a quantity of stock control sticks or pilot restraint systems in this case in the same way that a procurement officer might order a quantity of light bulbs or t-shirts. Government *engineers* approved the prime contractor's inclusion of specific components into a complex piece of equipment, after extensive evaluation of those components within the equipment. The government's approval of the final design of the T-34C is no less effective because that design incorporated component parts that may have pre-existed the T-34C.

Second, the plaintiff claims that the engineering drawings of the flight controls, the seat assembly, and the pilot restraint system are not part of the specifications for the T-34C because they conflict with another more general specification.[9] The plaintiff claims that the design of

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[9] Paragraph 2.13 of the Detail Specification, which incorporates the drawing set, states that "in the event of conflict

the T-34C conflicts with paragraph 3.2.4.1 of the Detail Specification, which states in relevant part:

> Production. . . . Where any vital moving part passes close to a fixed structure or item of equipment, the point of nearest contact shall be so located or arranged that gravity will normally clear this point of loose articles or cause them to take remote positions where they cannot jam or interfere with the moving part.

(DX Z p00179). Considering the language of this requirement and its location in a paragraph discussing production methods, the Court interprets this specification to require contractors to utilize production methods that prevent loose articles from falling into the moving parts of the airplane. There is no evidence to show that any production method or any interference between a loose article and a moving part contributed to this accident.

Finally, the plaintiff argues that the government contractor defense should not apply because the government did not proactively limit the contractors' ability to develop a safer design. For example, the plaintiff argues:

> [t]he fact is that the buckle could have been designed and manufactured by Pacific Scientific, in the manner suggested by the Plaintiff's expert, without violating any relevant government specifications, because there were none. Likewise, Beech could have incorporated into the design of the aircraft a nondefective buckle

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between this specification and the drawing set, this specification shall take precedence" (DX Z p00168).

> from Pacific Scientific or elsewhere, without violating any reasonably precise government specifications, because there were none with respect to the dangers and defects alleged in this suit

(DE 106 p9). The central weakness of the plaintiff's case is this focus on whether the contractors could have developed a safer design without *violating* any *government* specifications. The proper focus must be on whether the government *approved* specifications (created by its engineers or the contractors' engineers) that did not contain the safer design. It may be true that no government specifications existed at the time Pacific Scientific designed its buckle or Beech chose to use that buckle that would have prevented the inclusion of a buckle guard or the elimination of the vertical vanes. It is true, however, that reasonably precise specifications came into existence when Beech chose to use that buckle. When the government approved that choice through its design review process and extensive testing of the aircraft, the first element of the government contractor defense was satisfied.

The most significant factors to be considered in assessing the sufficiency of government approval include whether the government evaluated the contractor's detailed drawings at various stages of design, whether the government criticized the contractor's design, and whether the government extensively tested prototypes before accepting the design. *See In re Air Disaster* at 574 (5th Cir. 1996); *Stout* at 336. All of these factors are present in the design of the T-34C, creating exactly the type of "continuous back and forth" that makes application of the government contractor defense appropriate.

Because the summary judgment evidence demonstrates that all three elements of the government contractor defense are satisfied and that there is no genuine issue of material fact, the Court grants the defendants' motion for summary judgment on the plaintiff's design defect claims.

C. Failure to Warn

The government contractor defense can displace claims under state law for failure to warn as well as for design defects. The Fifth Circuit has stated that a "conflict between federal policy and state law might arise if there is evidence that the Government was involved in the decision to give, or not to give, a warning." *In re Air Disaster* at 575. The most recent appellate decision to apply the government contractor defense to a claim for failure to warn agreed with this principle, and applied a modified version of the *Boyle* test:

> [w]hen state law would otherwise impose liability for a failure to warn of dangers in using military equipment, that law is displaced if the contractor can show: (1) the United States exercised its discretion and approved the warnings, if any; (2) the contractor provided warnings that conformed to the approved warnings; and (3) the contractor warned the United States of the dangers in the equipment's use about which the contractor knew, but the United States did not.

Tate II, 140 F.3d at 656-57, quoting *Tate I*, 55 F.3d 1150 (6th Cir. 1995). The first condition of this test is "intended to closely parallel the first condition of the Boyle test." *Tate II*, 140 F.3d at 658. As in the design defect context, the

contractor need not prove that the government considered whether to warn of the particular hazard involved in the case. *Id.* Furthermore,

> [t]he first condition of the Tate I analysis requires only that the government exercise its discretion in approving the proposed warnings. In the failure to warn context, discretion occurs where the government is both knowledgeable and concerned about the contents of the proposed warnings before granting its approval. The government is sufficiently knowledgeable when it has a complete enough understanding of the proposed warnings to reasonably recognize which hazards have been thoroughly addressed and which have not. The government is sufficiently concerned when it demonstrates a willingness to remedy or require the remedy of any inadequacies it finds in the proposed warnings. Where government knowledge and concern are exhibited through the review process, it may be fairly said that the government has decided which warnings should and should not be provided to end users. *Id.*

Although the summary judgment evidence bearing on this question is sparse, the evidence in the record sufficiently demonstrates that the government exercised its discretion in approving the warnings included in the T-34C NATOPS Flight Manual. During the Initial Trials Phase of the T-34C Service Acceptance Trials, the Navy proposed two changes to the Flight Manual, including the addition of an explicit warning of a particular hazard (DX N pp01417-19). During the Final Trials Phase of the T-34C Service Acceptance Trials, the Navy proposed several additional changes to the Flight Manual, including two

explicit warnings of particular hazards (DX O pp01920-26). This evidence demonstrates that the Navy was concerned with the contents of the T-34C Flight Manual and the adequacy of the warnings included therein. The Navy's extensive testing and review of the YT-34C and T-34C demonstrate that the Navy was sufficiently knowledgeable about the operation of the aircraft to recognize which hazards had been thoroughly addressed and which had not. Although the Navy did not expressly evaluate a warning of the specific hazard of inadvertent seat harness release (because that hazard was latent to the Navy as well as to the contractors), the government contractor defense nonetheless applies because the Navy exercised its discretion *generally* to approve the warnings included in the flight manual.

In addition, the plaintiff cannot prevail on this claim under the law of Texas. To prevail on a claim of failure to warn, the plaintiff ultimately must prove that the failure to warn was a proximate cause of the accident. *Ritz Car Wash, Inc. v. Kastis,* 976 S.W.2d 812 (Tex.App. – Hous. 1998, writ den). "In the absence of a warning, a rebuttable presumption arises that the 'user would have read and heeded such warnings and instructions.' . . . A manufacturer may rebut the presumption with evidence that the plaintiff did not heed whatever warnings were given, or would not have heeded any proposed warnings." *American tobacco Co., Inc. v. Grinnell,* 951 S.W.2d 420 (Tex. 1997) (citations omitted), quoting *Magro v. Ragsdale Bros., Inc.,* 721 S.W.2d 832, 834 (Tex. 1986).

The summary judgment evidence demonstrates that the Navy added a warning of the risk of inadvertent seat harness release to the T-34C NATOPS Flight Manual three

years before Lt. Huber's accident (PX A Att3 p3).[10] The warning stated that "[i]mproper adjustment of the restraint harness may allow the control stick to contact the rotary buckle and result in inadvertent release of the harness. . . . If the control stick can contact the rotary buckle, the aircraft shall not be flown until that harness is readjusted and the buckle repositioned to remain clear of the control stick" (*Id.*). This evidence is consistent with the other evidence showing that the Navy's response to reports of inadvertent seat harness release was to instruct pilots to position the rotary buckle beneath the lobes of their life preserver units (DX B pp02211, 02448; DX G p180). This evidence showing that a warning was added to the Flight Manual three years before the accident rebuts the presumption that Lt. Huber would have read or heeded a warning included by the contractors twelve years before the accident. The plaintiff has produced no additional evidence to demonstrate that the contractors' failure to give a warning was a proximate cause of this accident.

The plaintiff responds that the Navy's warning should be ignored because it was inadequate, and that the contractors bore a duty under state law to give a more adequate warning (DE 80 p13). This response goes to the essence of the government contractor defense. The Navy decided for itself what warning to include in the Flight Manual prior to the accident in this case. There is no

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[10] The plaintiff has not objected to the admissibility of this magazine article as summary judgment evidence, and in fact relies upon the article in its response to the defendants' motions for summary judgment.

evidence to show that the defendants at any time knew more than the Navy about the risk of inadvertent seat harness release or potential solutions to that risk. The contractors cannot be held liable because the Navy's warning was inadequate or ignored.

Because there is no genuine issue of material fact, the Court grants the defendants' motion for summary judgment on the plaintiff's failure to warn claims.

D. Negligent Maintenance

The plaintiff contends that BASI's negligent failure to check for interference between the control stick and the harness buckle during routine preflight inspections, and negligent failure to replace the canopy on BUNO 161826, were proximate causes of the accident in this case. The plaintiff has not produced summary judgment evidence sufficient to create a genuine issue of material fact on every element of these causes of action.

The plaintiff first contends that BASI negligently failed to inspect "control stock clearance and seat harness condition and security" as required by the T-34C maintenance manual, and that this failure was a proximate cause of the accident in this case (DE 71 p48). This argument fails for two closely related reasons. First, because BASI did not manufacture or sell that T-34C, BASI's duty of care arises from its contract with the Navy to perform maintenance services. Texas law states:

> One who undertakes, gratuitously or for consideration, to render services to another which he should recognize as necessary for the protection

> of the other's person or things, is subject to liability to the other for physical harm resulting from his failure to exercise reasonable care to perform his undertaking, if
>
> (a) his failure to exercise such care increases the risk of such harm, or
>
> (b) the harm is suffered because of the other's reliance on the undertaking.

Colonial Savings Association v. Taylor, 544 S.W.2d 116, 120 (Tex. 1976). There is no evidence to show that BASI's failure, if any, to discover the risk of harm in this case increased that risk, because the risk was inherent in the design of the T-34C. See *Diaz v. Southwest Wheel, Inc.*, 736 S.W.2d 770, 773 (Tex.App. – Corpus Christi 1987). BASI thus can only be liable if Lt. Huber forbore from performing his own inspection of control stick clearance and seat harness condition in reliance upon BASI's undertaking to perform that inspection. See *Colonial Savings* at 120. To the contrary, the evidence shows that Lt. Huber performed his own inspection of control stick movement and harness condition as required by Navy preflight procedures (DX B pp02225, 02463).

For the same reason, there is no evidence to demonstrate that BASI's failure, if any, to inspect control stick clearance and seal harness condition prior to flight was a proximate cause of this accident. The summary judgment evidence indicates that contact between the control stick and harness buckle occurred intermittently, dependent on factors such as the size of the pilot, the vertical adjustment of the seat, and the acrobatic maneuvers of the airplane (DX B pp02475-78, PX A p4). There is no summary judgment evidence to show that a BASI employee

would have discovered contact between the control stick and the harness buckle during a routine preflight inspection on the ground.

The plaintiff next contends that BASI negligently failed to replace the rear canopy on BUNO 161826 when it had become brittle, and that this embrittled canopy failed to contain Lt. Huber in the aircraft. This claim is not supported by any summary judgment evidence other than the speculation of the plaintiff's aerospace engineering expert. In his deposition, Dr. Ronald Stearman speculated that the aircraft's rear canopy may have become brittle from exposure to ultraviolet radiation, excessive buffing, or exposure to cleaning agents (DX G pp137-38). He further speculated that this embrittlement may have contributed to the accident, because he had heard of another similar incident in which a pilot had hit his head on the canopy but had not gone through it (DX G p121). Dr. Stearman could not state the degree to which the canopy had become brittle (DX p138). Dr. Stearman did not know anything about the circumstances in which the other pilot had hit his head on the canopy, including the size of the pilot and the force with which the pilot hit the canopy (DX G pp122-23). In his opinion statement, Dr. Stearman states that "[f]urther studies are required to correlate the canopy loading conditions in this head impact loads study with the head impact load experienced in the present case of interest . . . to determine why one canopy fractured while a second under a similar loading condition did not" (PX A Att.2). Apparently this study was never conducted (DX G p121), and the results

of such a study are not in the summary judgment evidence. Furthermore, Dr. Stearman admitted in his deposition that the purpose of the T-34C's overhead canopy is to keep foreign material out of the aircraft while maintaining visibility, and not to hold the pilot in the aircraft (DX G p41). Dr. Stearman's speculations simply are insufficient to create a genuine issue of material fact as to whether BASI's failure to replace the canopy was a factual (much less a foreseeable) cause of this accident.

Because there is no genuine issue of material fact, the court grants BASI's motion for summary judgment on the plaintiff's negligent maintenance claims.

VI. CONCLUSION

The plaintiff's claims against Beech and Pacific Scientific for manufacturing defect and negligent inspection are foreclosed by the absence of summary judgment evidence to create a genuine issue of material fact on the elements of the claim. The plaintiff's claims against Beech and Pacific Scientific for negligence, strict liability, and breach of warranty are foreclosed by the government contractor defense. The plaintiff's claims against all defendants for failure to warn are foreclosed by the government contractor defense and by the absence of summary judgment evidence to create a genuine issue of material fact on the elements of the claim. The plaintiff's claims against BASI for negligent maintenance are foreclosed by the absence of summary judgment evidence to create a genuine issue of material fact on the elements of

the claim. For these reasons, the Court grants the defendants' motions for summary judgment.

ORDERED this 25 day of May, 1999.

/s/ H. W. Head, Jr.
H. W. HEAD, JR.
UNITED STATES
DISTRICT JUDGE

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

LINDA KERSTETTER,	§	
INDIVIDUALLY, AND AS	§	
PERSONAL REPRESENTATIVE	§	C.A. No.
AND HEIR OF THE ESTATE	§	C-96-512
OF DAVID JOSEPH HUBER	§	JURY
	§	
V.	§	
	§	
PACIFIC SCIENTIFIC CO.,	§	
INC.; ET AL.	§	
	§	

AFFIDAVIT OF RONALD O. STEARMAN, PH.D.

THE STATE OF TEXAS	§
	§
COUNTY OF TRAVIS	§

BEFORE ME, the undersigned authority, on this day appeared RONALD O. STEARMAN, PH.D. known to me to be the person whose name is subscribed to this instrument, who, being first duly sworn by me, upon his oath deposed and stated the following:

(1) "My name is Ronald O. Stearman. I am over 18 years of age. I am competent by personal knowledge to testify to the matters contained in this affidavit.

* * *

I am an aeronautical engineer. I am qualified by education and training to render

opinions concerning the airworthiness of aircrafts as to which their design or instructions for operation result in hazards to pilots or passengers of the aircraft. My teaching duties at the University of Texas include teaching courses on product reliability as it relates to aircraft and aircraft design, and I have performed studies and evaluations of aircraft in an academic context, in a forensic context, and otherwise, with regard to their propensities to failure and/or causing unacceptable levels of hazard.

(2) "In my deposition in this case, I testified concerning my opinions regarding the accident involved in this case. As reflected in my deposition, and in the attached report (Exhibit 2), it is my opinion that several aspects of the design of the aircraft involved in this accident caused a hazard to pilots such as David Joseph Huber of unacceptable magnitude. In my opinion, the cause of this aircraft accident was that Lt. Huber's control stick inadvertently contacted the rotary buckle on his safety harness, and that lateral movement of the control stick after such contact rotated the buckle, thus releasing the straps holding Lt. Huber in his seat. This is consistent with the findings of the Navy mishap report and the Navy JAG Corps investigation report concerning the cause of this accident.

(3) "More specifically, it is my opinion that the most likely scenario for Lt. Huber's accident was that the bottom rear portion

of the control stick grip handle contacted the face of the rotary buckle, caught one of the protruding vertical vanes that is raised on the face of the buckle, and by lateral pressure upon that vane, the control stick was able to rotate the buckle and release the tangs that fit into the buckle and connect to the restraint harness straps.

(4) "In my deposition, I approved of the methodology used after the accident to correct this design problem. Such methodology involved machining off the raised vertical vanes that provided a raised surface on the rotary buckle for the control stick to catch upon in order to provide the necessary traction to rotate the buckle; cutting off the rear bottom portion of the control stick grip handle; and installing a guard to protect the buckle plate from contact with the stick. I also testified that there were other methods to address this problem. Those methods would include a slight change in the shape or curvature of the control stick, a slight modification to the grip, or other methods of guarding the pilot's buckle from contact with the stick.

(5) "In my opinion, removing the vertical vanes that allowed for lateral movement of the stick to rotate the buckle, or else, slightly changing the curvature of the control stick such that the rear bottom portion of the control grip handle could no longer contact the buckle would have corrected the design deficiencies identified in my deposition sufficiently to have prevented this accident.

(6) "Subsequent to my deposition being taken, I have had the opportunity to review additional material including the depositions of Mr. Art Miller, maintenance personnel for Beech Aerospace in Corpus Christi, and Mr. Richard Tumlinson. I have reviewed portions of the maintenance manual and instruction manual concerning the aircraft in question. From these materials, from an inspection of an exemplar aircraft, and from reviewing design drawings of the aircraft, I have found no warnings or instructions contained in the manuals or on the aircraft concerning the extreme hazard to pilots associated with the possibility of inadvertent safety harness release by contact with the control stick during acrobatic maneuvers.

(7) "It also appears that Beech Aerospace, the maintenance contractor, was made aware of instances of inadvertent safety harness release by contact with the control stick prior to Lt. Huber's accident. In my opinion, warnings concerning adjustment of the fit of the safety harness prior to flight would not have been sufficient to address this hazard. This is because the pilot's body configuration and position changes during flight, particularly during acrobatic maneuvers such as the ones being performed when Lt. Huber's harness inadvertently released.

* * *

(8) "It also appears from the depositions of the maintenance personnel that there were procedures in effect for the maintenance

contractor to make suggestions concerning design deficiencies in the aircraft such as the ones identified in this affidavit, and the hazards to pilots associated therewith. Based upon the testimony of Beech personnel that I have reviewed, it also appears that the possibility of inadvertent safety harness release was discussed as early as 1986 in meetings between the United States Navy, Beech Aerospace, and Beech Aircraft personnel. Nonetheless, the testimony of the Beech maintenance and Beech Aircraft personnel appears uniform to the effect that neither company issued any warnings with regard to this danger, nor did they make any suggestions as to correction of this deficiency or as to ways of preventing personal injury or death as a result. Likewise, Pacific Scientific was aware of the possibility of severe personal injury or death resulting from inadvertent release of its unguarded, vaned aircraft safety harness buckles as a result of an incident involving a Sikorski Blackhawk helicopter gunner wearing a buckle of similar design.

(9) "In my opinion, neither the manufacturer of the aircraft, nor the manufacturer of the safety buckle, nor the maintainer of this aircraft gave adequate warnings of the aircraft's dangers that were known or by the application of reasonably developed human skill and foresight should have been known at the time of its manufacture or maintenance, and failed to give adequate instructions to avoid such dangers,

and that these failures rendered the aircraft unreasonably dangerous. These failures to warn and instruct continued in the face of documented instances of failure, up through, the date of the accident itself. It is further my opinion that as a result of such failures to warn and instruct, the aircraft was dangerous to an extent beyond that which would be contemplated by the ordinary instructor pilot or student pilot with the ordinary knowledge common to the flight instruction community as to the aircraft's characteristics. This opinion is supported by the fact that there were several instances of inadvertent safety harness release documented in Training Squadron Twenty-Seven at the Naval Air Station in Corpus Christi, but no apparent concern for personal injury or death, nor any suggested design change or plane modification, appears to have resulted from such instances, nor was any personal injury reported as a result of any such previous occurrences. However, an aeronautical design engineer working for an aircraft manufacturer, aircraft component manufacturer, or a reasonably sophisticated aircraft maintainer could have and should have foreseen the possibility for serious personal injury or death to pilots as a result of the existence of this problem within an aircraft designed for acrobatic use.

(10) "I have reviewed the design drawings and contract specifications produced by Beech Aircraft Corporation in this case regarding the T-34C aircraft in question. I have also

reviewed the design drawings and design specifications produced by Pacific Scientific Company in connection with the restraint harness and rotary buckle in use in this aircraft, as well as the Mason Electric design documents concerning the control stick grip handle. I have also reviewed the deposition of the corporate representative of Pacific Scientific, Florence Duggan-Bayne, and the depositions of Beech Aircraft and Mason Electric design personnel. I found nothing in the documents to indicate written United States Government or military specifications requiring that the rotary buckle installed in this aircraft at the time of its manufacture must have raised vertical vanes sufficient to enable contact with the control stick to rotate the buckle. Likewise, I have found no such specifications emanating from the government that would require that this aircraft, at the time of its manufacture, contain a control stick curved and configured precisely as the one that existed in this aircraft, nor a grip handle shaped and configured precisely as the one in this aircraft. From my review of such documents in this case, it is my opinion that this aircraft could have been manufactured and designed with a rotary buckle on the safety harness that did not have raised vertical vanes on its face, and that did have a buckle guard of some type to prevent inadvertent contact with the control stick without violating any reasonably precise government specifications pertaining to the design of the aircraft. Likewise,

from my review of such documents, it is my opinion that the control stick and grip handle could have been shaped differently so as to prevent contact with the rotary buckle in this case without violating any reasonably precise government specifications for the location of the control stick and its length of travel from forward to aft. While Beech argues that the entire set of drawings for the total aircraft were mentioned or incorporated by reference in the design specification for the aircraft, I do not regard the drawings, made by Beech, as reasonably precise government design specifications per se. According to Beech's design personnel, all the specifications for the design of this plane are contained in Exhibit 4 to the deposition of Mr. James D. Hutchens. Paragraph 2.13 of that document merely identifies, by reference to Beech drawings already in existence, the base airplane configuration to which the government specifications apply. That paragraph also states that 'In the event of conflict between this specification and the drawing set, this specification shall take precedence.' To me, this shows a distinction between 'this specification' and 'the drawing set.'

(11) "I read this as no more than a statement by the Navy that it wishes to procure the aircraft as already drawn and designed by Beech with the design modifications specified in the document marked as Exhibit 4 to the deposition of Mr. James D. Hutchens, as long as it meets the specific design specifications contained in that

document. This reading of the document is supported by the next to the last sentence of paragraph 2.13: 'In the event of conflict between this specification and the drawing set, this specification shall take precedence.'

(12) "With regard to the safety harness itself, the Beech drawings only call for the installation of an item already identified by model number by Pacific Scientific Company, which appears to have been designed by Pacific Scientific without reference to any government specifications (except with regard to matters not relevant to this case, such as the strength of the webbing material for the belts). This is based upon the deposition of Florence Duggan-Bayne.

(13) "With regard to the control stick grip handle, the Beech drawings similarly call only for installation of an item already identified by model number by Mason Electric, which item, based on the deposition of John Giors, appears to have been designed without reference to any then current government specifications (except with regard to irrelevant matters such as the color and type of material it is to be made of)."

Further Affiant saith not.

/s/ Ronald O. Stearman
RONALD O.
STEARMAN, Ph.D.,
Affiant

SWORN TO AND SUBSCRIBED BEFORE ME, the undersigned notary public, on this the 10th day of February, 1998.

/s/ Stephanie R. DeLaGarza
Notary Public in and for
The State of Texas

[LOGO]
STEPHANIE R. DELAGARZA
Notary Public
STATE OF TEXAS
My Comm. Exp. July 21, 2001

[LOGO] **Engineering Report**
[104E211 Page 37]

3.4.3 *Occupant Restraints.* The prime function of the occupant restraint system is to protect the personnel in the event of a crash and the restraint system should resist as high a crash load as possible. Therefore, the restraint system employed in the T-34C is a 5-point system.

With the 5-point restraint system all elements "plug into" a single action release buckle with metal-to-metal contract utilized throughout. The release action of the system requires the pilot simply rotate the inner portion of the buckle. The release action can be easily accomplished with either the right or left hand.

In accidents with high downward and forward decelerations sometimes the lap belt will tend to slip over the iliac crests of the pelvic bone with the occupant submarining under the lap belt. Subsequent decelerations will then place the belt load in the upper abdominal area which may cause injury to internal organs and the spine. In order to reduce the injury potential of the crash situation, the crotch strap has been added to the conventional 4-point system. The purpose of the crotch strap is to hold the lap belt down so it will take the high crash loads into the large pelvic bone structure. U.S. Army studies show that the crotch strap nearly doubles the tolerance to impact forces.The MA-6 multi-directional inertia reels which automatically lock when subjected to longitudinal or transverse acceleration of the aircraft are provided as part of the restraint system. The inertia reels are designed to lock at 3 g's but will not lock at 2 g's. A two position control lever for the inertia reel is mounted on the left side of the

[104E211 Page 38]

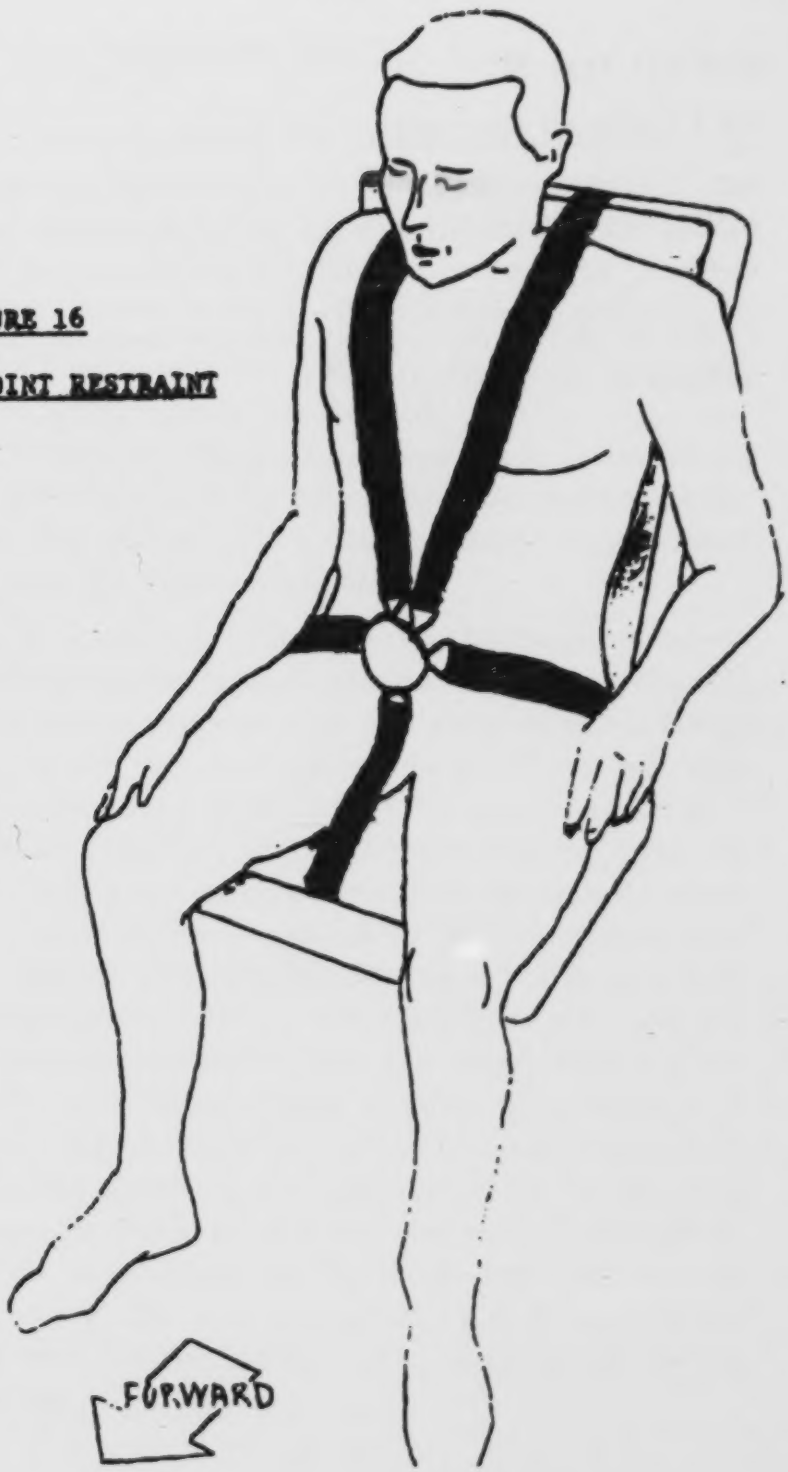
3.4.3 Occupant Restraints. (Continued)

seat pan; the control lever will select either the "AUTO-LOCK" or "MANUAL-LOCK" functions of the inertia reel.

Figure 16 shows the 5-point occupant restraint system utilized in the T-34C.

FIGURE 16

5-POINT RESTRAINT



THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

LINDA KERSTETTER	§	C.A. NO. C-96-512
V.	§	
	§	
PACIFIC SCIENTIFIC COMPANY, ET AL	§	

DEPOSITION TESTIMONY OF STICK HANDLE MANUFACTURER

* * *

[6] Q. Are you also familiar with another possible method of modifying the stick grip handle different from the one that we previously discussed where you could remove the rear lower corner of the stick handle? Have you seen a drawing of that? Are you familiar with that possible way?

A. I've seen an actual part. I don't believe I've seen the drawing.

* * *

Q. * * * And I just want to ask you basically the same series of questions with regard to that type of stick handle; that is to say, the type of stick handle that does not – where basically the lower rear corner of the stick handle has been removed.

* * *

Do you know of any reason why the manufacture or design of a stick grip handle with that corner of it removed would be in any way technologically [7] or

economically an unfeasible thing for Mason Electric or anybody else to do?

A. Providing that it still could mount as needed and that the integrity of the grip, the strength and so on, were not compromised, I would say I see no reason.

* * *

[9] Q. Okay. Does Mason Electric Company currently manufacture stick grip handles with the configuration you and I discussed where there is no bottom rear corner or the bottom rear corner of the stick grip handle has been removed?

A. No.

Q. Okay. But you have seen one that looks like that?

A. Yes.

Q. Okay. Other than a military specification dealing with the color and chemical composition of the material to be used in manufacturing the Mason stick grip handle in this particular case, are you aware of any other specific or general military or United States Government specifications specifying or determining or instructing Mason Electric in connection with the design of this stick grip handle?

[10] A. No military specs that I'm aware of, no.

Q. Okay. And I take it by your answer that there are no military or government specifications and were no military or government specifications insofar as you know that would have prevented Mason Electric Company from manufacturing or designing the stick grip handle in this particular case, for this particular aircraft

in a configuration where the rear bottom portion of the stick grip handle was not there or was in some way smaller or removed; is that correct?

A. I think the question is somewhat misleading because Mason did not design a grip specifically for that aircraft. That aircraft used a grip that was – that originated for another purpose for the A-4 – excuse me, the F-4 Sky Ray and was later chosen for use in this aircraft, but it was not designed for this aircraft.

Q. Thank you, and I appreciate that clarification. Actually, I was going to get to that question next.

A. Okay.

Q. Which is, as I understand it, this particular stick grip handle, the model number of which you identified in your previous deposition, sir, is a stick grip handle that was, in effect, a handle that had already – was, in effect, an off-the-shelf item.

[11] A. That's correct.

Q. Okay. It was available for purchase by any aircraft manufacturer in connection with any airplane, and you guys didn't place any kind of restrictions on its sale. That would be up to the aircraft manufacturer; is that right?

A. I would say that's generally correct, yes.

Q. So you're not aware of any specific military or government specification that would require you to make this handle or design this handle in any particular way, other than as to the strength of the material or the type of material it's made of; is that true?

A. For that particular grip, that's true.

Q. And with regard to this particular model of stick grip handle, was that stick grip handle in any way designed by Beech Aircraft Corporation or by anybody other than Mason Electric?

A. I don't really know the answer. I don't think it was by Beech because, again, they selected something that preexisted. It was – the first usage was for McDonnell-Douglas Long Beach and I'm not certain if we designed it to their drawing or their drawing was made from a grip we already had.

* * *

THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

LINDA KERSTETTER	§	C.A. NO. C-96-512
V.	§	
	§	
PACIFIC SCIENTIFIC	§	
COMPANY, ET AL	§	

DEPOSITION TESTIMONY OF
BUCKLE MANUFACTURER

* * *

[84] Q. Ms. Bayne, can you tell us what military specifications, if any, the safety restraint harness reflected in Bayne Exhibit No. 1 was manufactured or designed in accordance with, and I'm talking about prior to changes ECN- D through J.

A. I believe that any specifications would have been referenced in other documents than what is on here.

Q. Where would they be referenced?

A. Probably in a procurement specification.

Q. What is a procurement specification?

A. Something that Beech and the Navy would have agreed to. A specification between them.

[85] Q. How would you get that? I mean did you get a copy of that?

A. I was not able to find any copies.

Q. So there's no – based on your search of Pacific Scientific's records, there's no document reflecting that

Pacific Scientific or any evidence reflecting that Pacific Scientific ever received any specifications, procurement specifications from either Beech or the government; is that true?

A. Pacific Scientific's corporate retention policy, records are destroyed after seven years.

Q. Okay. Do you know whether or not the – I guess you wouldn't. Since you weren't there in 1976, at least not going this type of job, you wouldn't know of your own personal knowledge what Pacific Scientific received from Beech or the government in connection with this particular safety harness reflected in Exhibit 1; is that true?

A. That is true.

Q. Can you at least point out for us on [86] Exhibit No. Bayne No. 1 the military or United States Government specifications that are reflected in that drawing.

A. There is no military specification call outs reflected in this drawing.

Q. Actually, there's –

A. Well, there's the webbing. Excuse me, the webbing.

Q. Right. That's the MILLW spec?

A. Yeah.

Q. And that was the only one I could find is some kind of military spec that has to do with the material that's to be used in the belt.

A. Correct.

Q. Is that the only one you were able to find?

A. Yes.

Q. What evidence of any kind, if any, do you have that other than with regard to the webbing, the safety belt harness and seat buckle or safety buckle configuration that is reflected in Exhibit No. 1 to your deposition prior to 1983 was designed or manufactured by Pacific Scientific Company [87] in accordance with or pursuant to any kind of United States Government or military specifications?

A. Inertia reel on the control handles were covered by a MIL spec and the five point, – all of the webbing and hardware used in this system would be similar to systems that I know were supplied under MIL S specifications.

Q. When you say the control handle and the – you said the control handle and what else?

A. And the inertia reel.

Q. And the inertia reel, okay. Can you point out for me on the drawing what is the control – what you refer to as the control handle?

A. This portion right here up to here (indicating). The inertia reel down to about this little piece here, the lead-in strap.

Q. What is the control handle – it looks like it's a cable type thing.

A. Yes. It's just – this part here that's attached to the side of the seat and activates the inertia reel.

[88] Q. I see. That's what you're referring to as the control handle?

A. Correct.

Q. So your testimony is that the control handle which activates the inertia reel, the inertia reel and the webbing, to the best of your knowledge, those were covered by military specifications?

A. Yes.

Q. Any other parts of the assembly that's reflected in Exhibit Bayne No. 1 that to your knowledge were covered by or designed in accordance with military specifications?

A. The five point systems were all sort of a family that fall along with – I don't know whether it's MIL S 58095A or MIL S 81771 that covers restraint systems.

Q. What does that specification deal with?

A. Talks about loads and the type of environment they are supposed to be able to withstand.

Q. Is there any military specification that you are familiar with prior to 1983 that was utilized in the design or manufacture [89] of this safety harness restraint system that would require four vanes on the cover of the buckle as opposed to two?

A. Not to my – I have no knowledge.

Q. Is there any military specification that you are aware of prior to 1983 that or let's make it prior to 1984, prior to 1984 that would require that there be vertical vanes on the cover of the buckle of this assembly?

A. I have no knowledge.

* * *

Q. Sure. There's a 270 degree or three quarters of the way around the buckle guard that was added to the buckle in 1995 or '96, as I understand it.

A. Uh-huh.

Q. Do you know what I'm referring to?

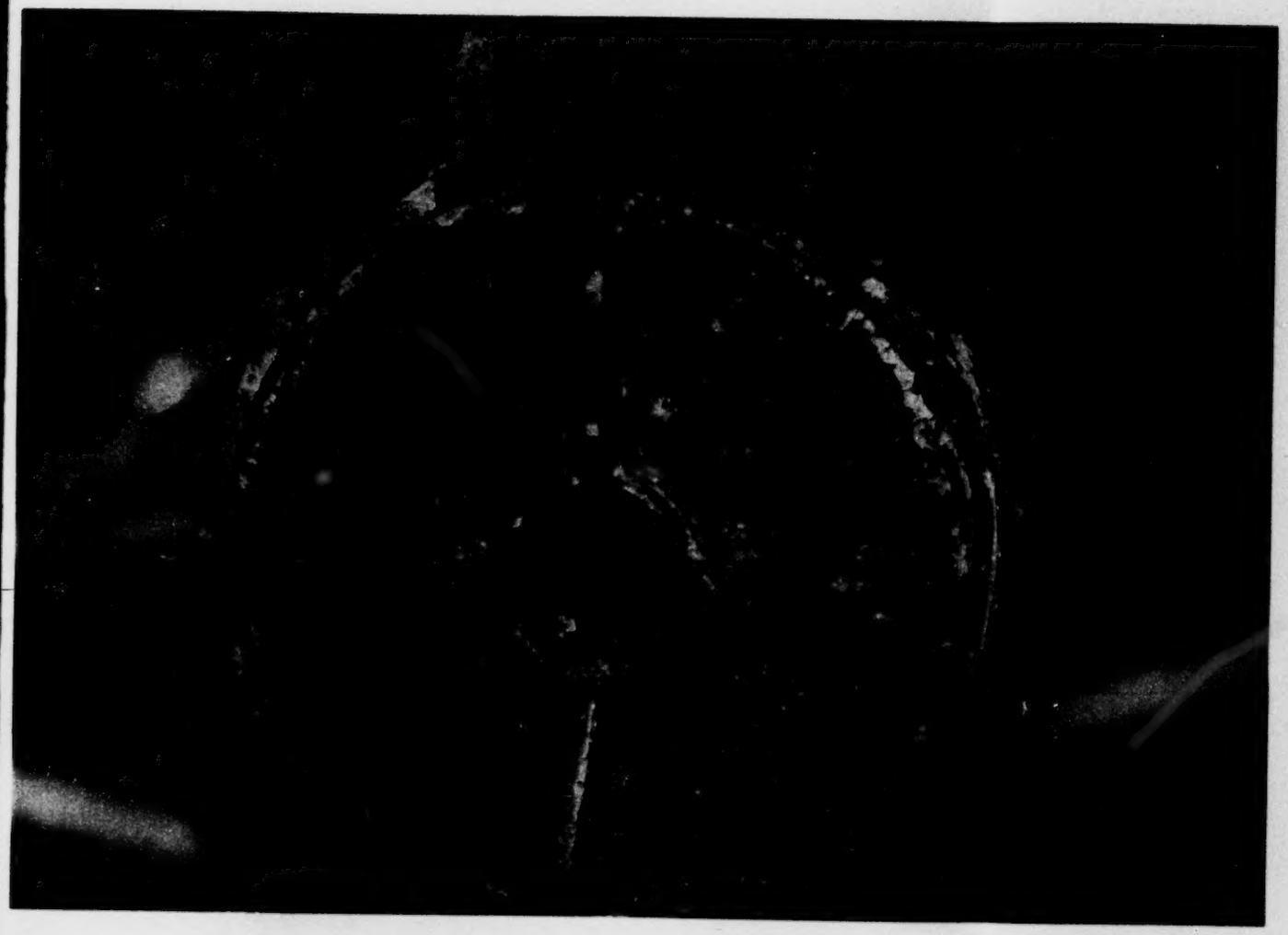
A. Yes.

[90] Q. Okay. Was there or is there any military specification prior to 1984 that this safety harness restraint system was designed or manufactured in accordance with that would have prevented or prohibited the addition of a 270 degree buckle guard on the buckle of this restraint system?

A. No. I know of none.

* * *

Photograph Of Buckle



Demonstration Of Control Stick Contacting Buckle



November 8, 1995
MEMORANDUM

FROM: JAMES BALL, U.S. Navy Air Systems Command

TO: T. SOUTH, BASI

SUBJ: MODIFICATION OF PACIFIC SCIENTIFIC ROTARY BUCKLES IN T-34C AIRCRAFT

REFERENCE:

* * *

1. REF A IS REPORT OF TEST RESULTS ON ALTERNATE AIRCREW RESTRAINT SYSTEMS. BASED ON THIS REPORT I INTEND TO GENERATE AN AIRFRAME CHANGE TO UPGRADE ALL T-34C AIRCRAFT ROTARY BUCKLES TO A "2 VANE, 3/4 GUARD" CONFIGURATION.

* * *

"REF A"

*****

REF E is T-34C NATOPS FLIGHT MANUAL. REF F is the general specification for design and construction of aircraft weapon systems.//rmks/1. Summary/Background: The purpose of this evaluation is to * * * significantly reduce or eliminate inadvertent harness release due to contact with the aircraft control stick. Inadvertent harness release was a causal factor * * * candidates were identified and obtained * * * one week of ground testing conducted on seven * * * candidates using subjects with wide ranges of anthropometric measurements yielded four * * * to

flight test * * * two * * * were identified that are compatible with the primary training mission and which significantly reduce the potential for inadvertent release by contact with the control stick: The PACSCI two-vane buckle with three-quarter guard and the PACSCI three-vane buckle with three-quarter guard.

*****

A T-34C stick modified by removing a small wedge of material from the aft lower portion of the grip (the buckle contact point) was evaluated in the rear cockpit.

*****

4. RESULTS/EVALUATION: for ground tests, all seven candidate AARS were evaluated for accommodation, range of occupant and flight control motion, ingress, emergency egress, and compatibility with the primary training mission. All emergency egress times were within the 30 sec requirement of Ref F, with or without the parachute. All candidate AARS were less susceptible to inadvertent release due to contact with the control stick than the production T-34C harness and buckle.

*****

The PACSCI two and three-vane guarded buckles were preferred due to their overall performance and similarity to the original T-34C aircrew restraint harness. The PACSCI two-vane guarded or three-vane guarded buckles will allow NAVAIRSYSCOM to readily retrofit T-34C's with a safer harness configuration without having to conduct increased training to familiarize aircrew with a new harness configuration. The PACSCI two-vane

guarded and PACSCI three-vane guarded AARS are satisfactory for the primary training mission. Recommend NAVAIRSYSCOM incorporate the PACSCI two-vane guarded or PACSCI three-vane guarded AARS in the T-34C as soon as possible.

6. CONCLUSIONS: The PACSCI two-vane buckle with three-quarter guard and PACSCI three-vane buckle with three quarter guard AARS are both satisfactory for the primary training mission.

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